Founded in 1832

RAILWAY LOCOMOTIVES AND CARS

OCTOBER 1955

One of Five Specialized Railway Age Publications

formerly Railway Mechanical and Electrical Engineer

Salt Lake City Diesel Shop

GM and Talgo Trains

Planned Locomotive Maintenance

Changes in ICC Inspection Rules

WHAT EVERY CAR MAN KNOWS—

The men who have assembled over a million Unit Trucks since 1940 know this—

The Unit Brake Beam, together with its matching pair of side frame guide wear plates is the simplest and most dependable type of brake rigging that can be applied to a freight car.

That is why Unit is STANDARD on most* freight cars built in the U. S. today.

When you buy Unit—insist on BUFFALO-UNIT BRAKE BEAMS AND UNIT WEAR PLATES. They were designed to work together for years and years of dependable, economical service.

*In 1955—more than 95% to date

UNIT TRUCK Corporation

ROAD WASHES CARS STREAK-FREE

WITH A 75% SAVING IN CLEANER COST

Improved Oakite Compound No. 88 banishes road-soil — even coach windows come out spotless

The coach-washing compound used formerly at one terminal washed away accumulated oil, grease and crater dust all right. But while it solved one problem, it created another. Car sides and windows streaked badly. Dissatisfied with results, the company called Oakite.

The Oakite Technical Representative recommended Oakite Compound No. 88 for the job. He lent a hand—first, in seeing that the material was used properly; and, then, in making needed adjustments at the washer to get maximum results. In the first trial, a 3 ounce per gallon solution showed a big improvement. Not satisfied, the Oakite man reduced the concentration to 1 ounce. While this eliminated all streaking, it did not remove all dirt. So, 1½ ounces were used. That did it! With 125 cars washed that night, morning inspection revealed 125 shining examples of cleaning efficiency. Sides were streak-free, glass sparkled, dirt had vanished.

What's more, the cars not only were cleaned better, but also at 75% less materials-cost—each car taking about 10¢ worth of material instead of the former 45¢.

Oakite has materials for manual and automatic methods that speed and simplify car washing.

Proving that . . . in railroad cleaning, it pays to call in Oakite, because you get cleaning *results*, and not just cleaning *materials*.

IDEAS FOR SAVING in maintenance cleaning are given in this 56-page Booklet No. F-8055. Data include methods for cleaning running gear, filters, Diesel units, electrical equipment, and other tedious, time-consuming yard problems. For your free copy write Oakite Products, Inc., 46 Rector Street, New York 6, N. Y.

OAKITE PRODUCTS, INC., 46 RECTOR STREET, NEW YORK 6, N. Y.
In Canada: Oakite Products of Canada, Ltd., 65 Front St. East, Toronto, Ont.

OAKITE.

RAILWAY DIVISION

AIR COSTS MONEY!

Stop leakage with new WABCOSEAL® Angle Cocks

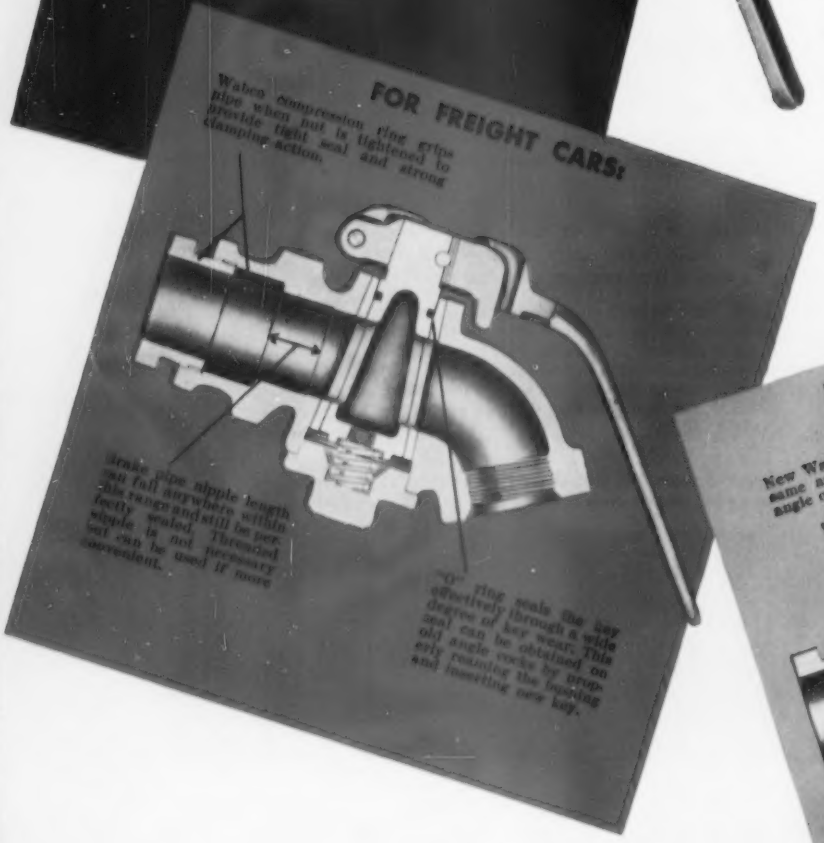
BRAKE pipe leakage increases compressor operation, lowers its efficiency and causes difficult train handling. Reduce leakage to the minimum by installing the *new* Wabcoseal Angle Cock shown here. Two styles are available—with or without spring-locking handle.

Heart of the new Wabcoseal Angle Cocks is the sealed key that stays tight through a wide degree of key wear. A Wabco compression ring replaces the standard tapped thread at the brake pipe end to give a positive seal. Also, adequate end tolerance is provided so brake pipe nipple need not be cut to precise length.

The passenger car and locomotive angle cock has a spring loaded handle that snaps the socket into locked position when handle is fully open or closed and keeps it there despite vibration and shock.

The sealed key and spring locking handle are available separately for application to present angle cocks.

Westinghouse Air Brake
COMPANY
AIR BRAKE DIVISION WILMERDING, PA.


FOR FREIGHT CARS:
When compression ring grips pipe when nut is tightened to provide tight seal and strong clamping action.
Brake pipe nipple length can fall anywhere within this range and still be perfectly sealed. Threaded nipple is not necessary but can be used if more convenient.
"O" ring seals the key effectively through a wide degree of key wear. This seal can be obtained on old angle cocks by properly reaming the housing and inserting new key.

FOR PASSENGER CARS AND LOCOMOTIVES:
New Wabcoseal fitting is same as for freight car angle cock shown at left.
Shouldered Pin
Strong spring is compressed when handle is raised. Socket is snapped into locking position when handle is fully opened or closed. Available for application to angle cocks now in use. A shouldered pin provides proper freedom of handle movement.
Sealed key is identical to freight car angle cock key shown at left.

PUBLISHED MONTHLY BY THE

SIMMONS-BOARDMAN

PUBLISHING CORPORATION

EDITORIAL AND EXECUTIVE OFFICES:

30 Church Street, New York 7
79 West Monroe St., Chicago 3

H. C. WILCOX
Editor, New York

C. B. PECK
Consulting Editor, New York

A. G. OEHLER
Electrical Editor, New York

E. L. WOODWARD
Pacific Coast Editor, Santa Monica, Cal.

G. J. WEIHOFEN
Western Editor, Chicago

F. N. HOUSER, JR.
Associate Editor, New York

LILLIAN D. MILNER
Editorial Assistant, New York

C. W. MERRIKEN, JR.
Business Manager, New York

MICHAEL J. FIGA, JR.
Director of Production, New York

BRANCH OFFICES:

1081 National Press Bldg.
Washington 4, D. C.
Terminal Tower
Cleveland 13
835 Terminal Sales Bldg.
Portland 5, Ore.
244 California Street
San Francisco 4
1127 Wilshire Blvd.
Los Angeles 17
3908 Lemmon Ave.
Dallas 19, Tex.
1809 Ponce De Leon Blvd.
Coral Gables, Fla.

FOREIGN REPRESENTATIVES.

Sibley-Fields Publishing Company, Ltd.
48 London Wall, London E.C. 2, England
Linder Presse Union GMBH
International Advertising Agency
(16) Frankfurt a.Main
Wittelsbacher Allee 60, West Germany

Railway Locomotives and Cars is a member of the Associated Business Papers (A.B.P.) and the Audit Bureau of Circulation (A.B.C.) and is indexed by the Industrial Arts Index and also by the Engineering Index Service. Printed in U.S.A.

RAILWAY LOCOMOTIVES AND CARS

Founded in 1832 as the American Rail-Road Journal

OCTOBER, 1955 - VOLUME 125, NO. 10

Editorials 43
What the Alert Car Inspector Finds; Life Span Should Control Maintenance

Motive Power and Car

UP Opens Salt Lake City Diesel Shop 45
Each month UP inspects and services 4,000 units in this $6,000,000 shop

Completely Automatic Steam Plant 50
Steam generators and automatic controls have changed the Algoma Central's power plant

How to Plan a Diesel Shop 52
Use the old, or build them new? Shops are discussed by an LMOA committee

"Lightweight Train Day" at Chicago 55
Rock Island tests ACF Talgo at over 100 mph while GM reveals added details on new Aerotrain

ICC Revising Inspection Rules 58
Diesels are forcing changes in rules originally written for electric locomotives

Electrical Section

Planned Locomotive Maintenance 62
H&M Demonstrates Air-Conditioned Car 66
Self-Timing Degreasing 67
The Diesel That Played Crawfish 68
RF&P Modernizes Coaches 69
Photoelectric Flashover Protection 70
Belt Matcher 70
Icing Rack 70
Corn Cob and Wood Pellet Cleaning 71

Departments

Equipment New Ideas—New Uses 6
News 14
Personal Mention 22
Supply Trade Notes 23
? ? ? ? ? ? 85
Questions and Answers 92
Index to Advertisers 116

Published monthly by the Simmons-Boardman Publishing Corporation at 1309 Noble St., Philadelphia, Pa. Entered as second-class matter, January 16, 1953, at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. **Subscription Price** to railroad employees only in U.S., U.S. possessions and Canada, $2 one year, $3 two years, payable in advance and postage free. Subscription price to railroad employees elsewhere, $8 per year. Single copies, 50¢. Address correspondence concerning subscriptions to Robt. G. Lewis, Vice-Pres. and Dir. of Circulation, 30 Church St., New York 7.

Simmons-Boardman Publishing Corporation: James G. Lyne, President, New York; Samuel O. Dunn, Chairman Emeritus, Chicago; J. S. Crane, Vice-Pres. and Sec., New York; H. H. Melville, Vice-Pres., Cleveland; C. W. Merriken, Vice-Pres., New York; John R. Thompson, Vice-Pres., Chicago; Wm. H. Schmidt, Jr., Vice-Pres., New York; John S. Vreeland, Vice-Pres., New York; Fred W. Smith, Vice-Pres., Chicago; Robert G. Lewis, Vice-Pres., New York; Arthur J. McGinnis, Exec. Vice-Pres. and Treasurer, New York; John Gavora, Jr., Asst. Treas., New York.

Resists corrosion, abrasion, impact. Underframes and sides of this Delaware and Hudson boxcar are made of Mayari R, a high strength low alloy steel containing nickel, produced by Bethlehem Steel Co., Bethlehem, Pa. This type of nickel steel readily responds to usual fabricating operations, including forming and welding. Its high strength, as-rolled, permits reducing deadweight or increasing safety factors

Car's capacity raised to 97,000 pounds by using alloy steel to cut deadweight

100 OF THESE BOX CARS! Every one of them giving the Delaware and Hudson Railroad stronger and at the same time lighter rolling stock.

Deadweight per car is cut to 39,000 pounds . . . by designing to use underframes and sides made of a high strength low alloy steel containing nickel.

This saves money in three ways. First, a 39,000-pound boxcar reduces track maintenance expense. Second, it helps increase revenue per ton mile by permitting a 97,000-pound payload without exceeding the AAR rail-load limit of 136,000 pounds.

And especially important, this sort of car has a greatly increased life because structures made of high strength low alloy nickel steels retain a high degree of their original strength during years of use. Steels of this type provide five times the atmospheric-corrosion resistance of carbon steel, and two or three times that of copper-bearing steel.

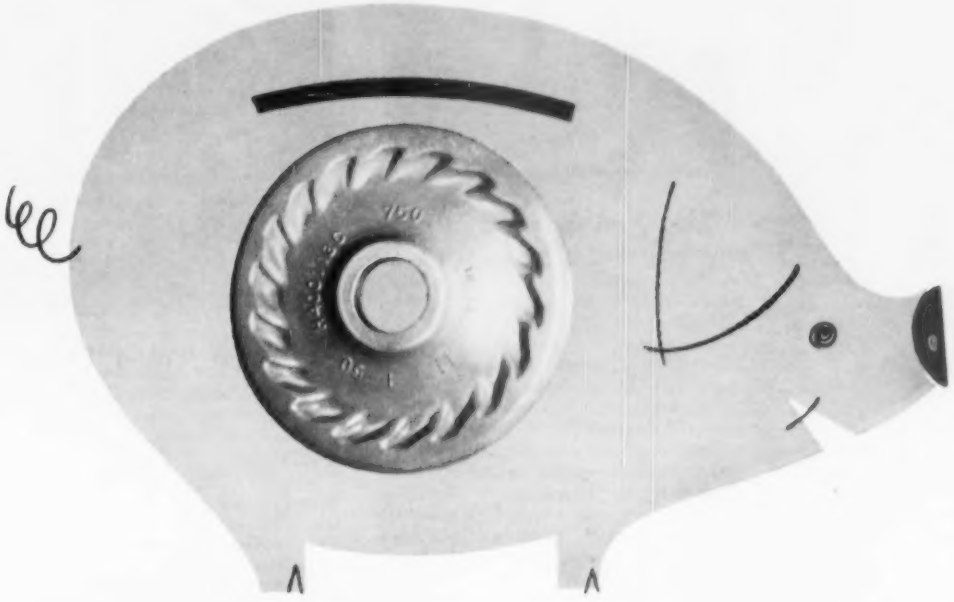
Naturally, with lengthened ability to withstand battering, abrasion and shock, use of cars made of these nickel alloy steels not only minimizes maintenance work, but also gives the user maximum return per dollar invested.

Moderate in cost, high strength low alloy steels containing nickel along with other alloying elements are produced under a variety of trade names by leading steel companies.

Learn more about these steels, and how they can help you . . . send for a copy of "Nickel-Copper High-Strength Low-Alloy Steels." It's yours for the asking.

INCO **THE INTERNATIONAL NICKEL COMPANY, INC.** 67 Wall Street New York 5, N. Y.

The car wheel that starts saving money before you buy it!



Production of chilled car wheels in 23 cities throughout the U. S. assures quick, low-cost delivery from AMCCW plant near you.

When you order AMCCW chilled car wheels, you get the benefit of short-haul delivery...which means you get the wheels sooner, pay less freight charges. Means you can make a small inventory do the job of a larger one, too.

When the wheels arrive you find they bore faster, are easier on cutting tools, and require less pressure for mounting.

And when, after longer-than-ever, safer-than-ever mileage the wheels finally wear out, you have the same short haul to the nearest AMCCW plant, where low exchange rates keep replacement cost to the very minimum.

Available locally
Short-haul delivery
Reduced inventory
Low first cost
Low exchange cost
Increased ton mileage
High safety standards
AMCCW plant inspection
Easier shop handling

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS

AMCCW

445 North Sacramento Boulevard, Chicago 12, Ill.

Albany Car Wheel Co. • ACF Industries, Inc.
Marshall Car Wheel & Foundry Co. • Griffin Wheel Co.
Pullman-Standard Car Mfg. Co. • Southern Wheel (American Brake Shoe Co.)

EQUIPMENT... *New Ideas—New Uses*

Air-Cooled Diesel Engine

Model DRP is a 4-cycle, air-cooled, solid injection full diesel engine. It is rated at 15 hp, corrected bhp with accessories, at 2300 rpm. The opposed two-cylinder design is said to provide smooth running operation, and air cooling eliminates the need to maintain radiator, fan belt, etc.

The engine has a 3½ in. bore, 3½ in. stroke and a 67.3 cu in. piston displacement. Compression ratio is 17.3-1. The unit weighs 516 lb. Crankshaft and connecting rods are of forged steel, with large bearing surfaces. A 12-volt battery charging generator and 12-volt electric starter are supplied as standard equipment. Other accessories include a throttle lever template, timing gauge and instruction manual. *D. W. Onan & Sons, Inc., University Ave. S.E. at 25th, Minneapolis.*

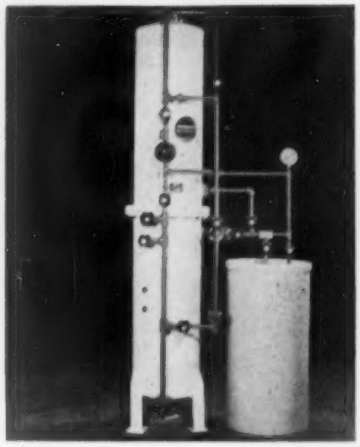
Marking Ink

A fast-drying ink in a package applicator marks on rough or smooth surfaces such as castings, bar stock, machinery, tools, dies, glass, wood or plastic. The ink, it is said, will not readily chip, peel or be affected by heat or weathering.

The ink is packaged in a burst-proof tube fitted with a smooth acting ball point. Different size ball points and seven standard colors are available. *John P. Nissen, Jr., Company, Glenside, Pa.*

Safety Spectacles

Optilite when used in safety spectacle lens is said to give more comfort, better appearance, and greater protection than safety glass lenses. It is a lightweight, transparent lens material of compounded resins. Weighing only half as much as safety glass, this material is said to have twice the strength of the same thickness of safety glass. The material in a series of tests, underwent high impacts without shattering. *United States Safety Service Company, Kansas City 6.*



Mixed-Bed Demineralizer

The Model MBD-15 Demineralizer is for the demineralization of relatively small quantities of water—up to 360 gal per hr. It is a compact unit which contains a resin bed consisting of a mixture of cation exchangers and anion exchangers. It will produce a water of low total dissolved solids, low carbon dioxide, low silica content and extremely low conductivity.

Treated effluent from the unit will have an average conductivity of 0.15 microhms, equivalent to approximately 6,000,000 ohms/cm specific gravity or 0.05 ppm total electrolyte content. Flow rate is 6 gpm average to 7.5 gpm maximum. It has a kilograin capacity of 24,000 grains total dissolved solids. The tank, containing 5.4 cu ft of resin, is 15 in. in diameter, 7 ft 7 in. in overall height, and is protected with 6 coats of Heresite lining. The resin bed is regenerated with 12 lb of sulfuric acid for the cation exchanger and 20 lb of caustic soda for the anion exchanger. *Permutit Company, 330 W. 42nd street, New York 36.*

Ladder Leg Extensions

Ladr-Levl, a safety device easily attached to wooden or steel ladders, has self-adjusting legs that adapt themselves to any terrain, no matter how uneven. The ladder can stand upright, and it is said that the non-skid, swiveling feet prevent any slipping. There is sufficient adjustment to accommodate standard 9½-in. stairway risers.

When the user puts his weight on the first ladder rung, the mechanism locks automatically in place, and can be unlocked only by hand. The weight of the ladder is always directed down along the side rails and lateral stresses are said to be eliminated. Installation of this device is reported to be simple, and it can be transferred from ladder to ladder. Ladr-Levl is made of an aluminum alloy, withstands a 1,000-lb ladder load test, and weighs 5 lb. *H-B Industries, Inc., 1401 Middle Harbor Road, Oakland, Cal.*

Packaged Toilet Units

Totally packaged toilet and washroom units fabricated largely of impervious stainless steel provide complete toilet accommodations in minimum space. Each Travel-Lav, as these units have been named, is said to have the size and engineering that offer great freedom in laying out plumbing for roomettes and bedrooms on new and rebuilt cars.

Both the wash basin and toilet make use of the same floor space, each being arranged to fold away when not in use. Machined parts have been designed for foolproof operation, and the unit's design mechanically and structurally is said to meet the highest sanitation requirements. Provision is made for servicing every component of the unit. Each Travel-Lav is shipped as a complete assembly ready for the hook-up of water and waste lines, and each can be supplied in stainless, gray hammered, or primed finish. Towel and cup dispensers, soap dish, mirror and lighting are provided in the various models.

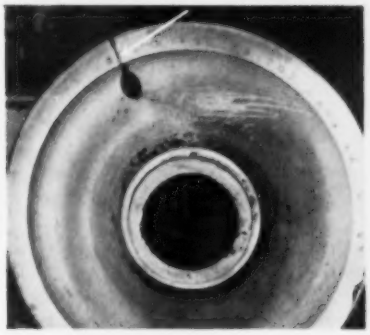
The smallest unit occupies a floor area of 8½ x 20-in. A unit with a shower fits a space 21½ x 39-in. *Angelo Colonna, Westmoreland and Boudinot streets, Philadelphia.*

Balancer for Flat-Car Trailer Bridge

A balancer for the trailer bridges used on piggy-back flat cars uses torsion-spring bars which are mounted and operated like those that balance the ends of drop-end gondolas. The bars are secured at their inner ends in a trunnion-and-spring anchor mounted on the end sill of the car. The trailer bridge is built out from a 3½-in. o.d. tube

(Continued on page 10)

NEW INSPECTION METHOD PROVES MORE ACCURATE



Safety and profit are two of the prime requisites of any successful railroad. Every additional mile that a railroad can *safely* obtain from its equipment means increased profit for the road.

The best known method of increasing the life of mechanical equipment of any type is a sound preventive maintenance schedule. One facet of preventive maintenance is the inspection for metal soundness of parts that are subjected to stresses and strains. A hidden crack or other flaw in a critical part could, if not repaired or replaced, cause disaster.

For years, railroad operators the nation over have been searching for a safe and accurate, yet easy-to-use and inexpensive method of locating defects in metal surfaces. In Dy-Chek, a dye penetrant flaw location process manufactured by Turco Products, Inc., the solution has been found.

There are two major advantages of the dye penetrant inspection process over methods formerly used. First the process will locate surface flaws in any metal—ferrous or non-ferrous, magnetic or non-magnetic. Additionally, the process requires neither special lights nor darkened booths. Since flaws are clearly visible under almost any lighting conditions, accuracy of flaw detection is not reduced by improper maintenance or deterioration of electrical equipment. The operator is not subjected to constant changes in light intensity. Thus, eye fatigue and the resultant factor of human error is held to a minimum.

Key to the exceptional accuracy of Turco's Dy-Chek method of dye penetrant inspection is said to be the make-up of the Penetrant and the Remover-Emulsifier (the material used for removing the excess surface penetrant from the part being inspected). Turco's Penetrant is *not* water soluble. It is rendered removable with water *only after application of the Remover-Emulsifier*. Since the Remover-Emulsifier is applied by brushing or dipping, and then immediately rinsed off the part, it does not have a chance to enter the flaw. Thus, a heavy water rinse can be employed without danger of removing Penetrant from even shallow or wide open defects. This factor is particularly advantageous on irregular surfaces or sand castings, as it is necessary that all traces of surface penetrant be removed.

A full color and sound, twenty-three minute 16mm motion picture which visually demonstrates every aspect of flaw location with dye penetrants has recently been completed by Turco and is available for free showing to railroad groups. The film is more fully described in the advertisement to the right.

(Advertisement)

FREE Showing
TRAINING MOVIE
DYE PENETRANT METHODS OF FLAW DETECTION

IN YOUR PLANT OR LOCATION OF YOUR CHOICE

full color... **clear narration**

PLUS ACTUAL DEMONSTRATION OF DYE PENETRANT INSPECTIONS

Now... your inspection department can get the full story of flaw location with dye penetrants... can see *actual on-location* dye penetrant inspections, *right in your own plant!* Produced by Turco, manufacturer of the Dy-Chek® inspection process, this film visually demonstrates *every* aspect of dye penetrant inspections from laboratory theory to authentic production-line techniques actually filmed on the spot during mass production inspections.

If your plant or technical group is interested, write today for full details without cost or obligation.

Attention: **RAILROADS!**

SEE... Location of fractures in diesel wheels

SEE... Mass production inspection of valves and other small parts

SEE... Detection of heat cracks in disc brake plates

TURCO

Offices in all principal Cities

TURCO PRODUCTS, INC.

Chemical Processing Compounds

6135 So. Central Ave., Los Angeles 1, Calif.

PLEASE AFFIX COUPON TO COMPANY LETTERHEAD

Turco Products, Inc.
6135 So. Central Ave., Los Angeles 1, Calif.

☐ Contact me to arrange for film showing

☐ Send more details on film

Name _____

Title _____

NEW NORTHERN PACIFIC RAILWAY REEFERS RIDE LIKE VISTA-DOMES...ON FREE-LATERAL HYATTS!

When you're viewing the grandeur of the Rockies from the luxurious Vista-Dome North Coast Limited, the gliding riding comfort of HYATT Roller Bearings adds a lot to your enjoyment of the journey.

Now fresh and frozen foods, too, are speeding across the Continental Divide on *free-lateral* HYATTS in the N.P.'s new fleet of fifty ultra-modern mechanical refrigeration cars! For the N.P. has learned that HYATTS not only prevent costly hot-box delays, reduce motive power, lubrication and inspection costs—their *free lateral* feature also decreases lading damage and wheel, truck and car wear by a substantial margin.

Compare performance records carefully before you choose—and like the Northern Pacific, you'll make the *one* logical choice:

HYATT ROLLER BEARING JOURNAL BOXES

RUNNING MATE OF FASTER FREIGHT

HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION • HARRISON, NEW JERSEY

we harnessed LIGHTNING FOR YOU!

...toughest DIESELS
come alive
at its touch

No Diesel is big enough or tough enough to stump this sensational new-type battery—it starts them all with ease. And recharge is so rapid that full rated capacity is available again in almost no time.

The secret lies in the patented VOLTABLOC® construction with sintered nickel and cadmium plates, tightly compressed to deliver energy immediately on demand.

No water or electrolyte need ever be added, cells are hermetically sealed—they are maintenance-free.

Shock, vibration, overcharging, short circuits have no harmful effects—VOLTABLOC's® special construction makes them practically indestructible electrically and mechanically—they can be stored indefinitely in any state of charge or discharge.

SAFT AMERICA

Sizes from 0.8 to 160 a.h.
For complete information write today to
Saft Corporation of America,
10 GREGG STREET, LODI, NEW JERSEY

VOLTABLOC®—"The battery that harnessed lightning"

(Continued from page 6)

which contains the spring anchor securing the outer ends of the two torsion bars. The bars run the length of this tube and have an overall length of 4-ft 5-in. It is said that they facilitate the operation of the trailer bridges. *Wine Railway Appliance Company, 2237 Waterworks drive, Toledo 9, Ohio.*

Valve Guide Cleaners

These wound-in-wire nylon valve guide cleaners are said to remove all sludge and varnish, even from hard to reach oil grooves. In addition, they polish and burnish with no possible danger of scratching. There are 10 different sized cleaners, ranging from ¼ in. to 1-1/16 in. They are designed to fit all engines in popular use today. For identification, sizes are marked on the shank. Sizes, 5/16, 11/32, and 3/8 in. are packed in a transparent plastic pouch. *Black & Decker Mfg. Co., Towson 4, Md.*

Chemical Cleaning Compounds

Low toxicity, high flash point, and non-corrosive properties feature this series of solvents for railroad maintenance. Safe-Tee solvent FO 128 is a substitute for carbon tetrachloride. It is said that this preparation will not attack insulation or damage delicately machined surfaces. FO 106 is a solvent emulsion type cleaner for exterior car cleaning and the degreasing of locomotive parts, engines and shop pits and floors. FO 106 is diluted for use. Heavy-duty cleaning and degreasing are done with FO 116. Underbodies, running gear and surfaces subjected to heavy oil, asphalt and other stubborn accumulations are cleaned with this material. A hot-dip carbon remover, FO 102, was developed to remove binding gums, oils and other surface deposits from pistons, piston rings, fuel pumps and engine assemblies. *Fine Organics, Inc., 211 East 19th street, Dept. MD, New York.*

Packaged Gear Lubricant

The Jet Lube Poly-Bag, a polyethylene plastic sack containing Sinclair Jet Lubricant, can be dropped into diesel locomotive traction-motor gear cases. The transparent container holds a pound of grease in an easy-to-handle 8⅛x3½ in. size, which eliminates measuring or weighing before application.

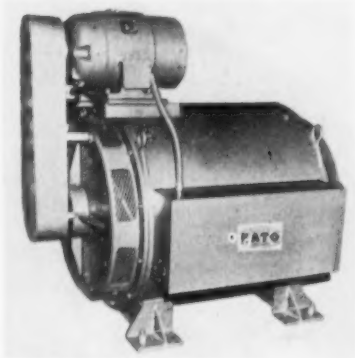
The package design, it is said, simplifies servicing. All the maintenance man has to do is drop the Jet Lube into the gear case and the job is completed. When the gears mesh in motion, the bag disintegrates and becomes part of the grease mass. Tests by railroads have shown labor cost savings. *Sinclair Refining Company, 600 Fifth Avenue, New York.*

All Steel Press Brakes

Two press brakes, 2-30 Series and the 3-50 Series, are designed to answer the need for light capacity brakes.

The 2-30 brake has a capacity of 30 tons and will bend 6 ft of 14 gage mild steel. It has a distance between housings of 5 ft 2 in. and an overall die surface of 6 ft. Horns can be added to increase overall die surface. The unit has a 2½ in stroke, a 9 in. gap and a 4 in. manual ram adjustment. Power adjustment is available as a special feature.

The 3-50 Series has a capacity of 50 tons and will bend 6 ft of 10 gage mild steel. This series is built in two sizes and has an overall distance between housings of 6 ft 6 in. or 10 ft 6 in. and an overall die surface of 8 ft or 12 ft. Horns can be added to either model to increase the overall die surface. This unit has a 3-in. stroke, a 5-in. power adjustment to the ram as standard equipment and a 12-in. gap. *Cincinnati Shaper Company, Hopple, Garrard and Elam streets, Cincinnati 25.*



Electric Generator

A series of a-c generators range up to 500 kva have been made available. The Model 92BROR unit, rated at 500 kva, 400 kw, 3 phase, 60 cycle, 1200 rpm, 220/440 volt, features an overhead belted exciter. It is also available with a direct connected exciter. Its frame is of heavy welded steel construction with endbells of cast iron.

The generator is also manufactured in a single bearing design, adaptable to standard SAE bell housings. The frame size will accommodate generators from 150 through 300 kw at 900 rpm and also from 200 to 450 kw at 1800 rpm. Standard voltages are available at 2300 volts. *Kato Engineering Company, 1415 First street, Mankato, Minn.*

Cable Vulcanizer

This electrically operated cable vulcanizer, weighing only 16 lb less molds, is capable of making repairs on cable up through 2 in. in diameter. It is available for use on standard ac and dc voltages with a wattage rating of 1000, and is designed to make on-the-job jacket repairs or to completely replace insulation and jacketing when splices are required. Aluminum molds for use with the device have been developed to cover most standard and many special types of cord and cable. *Joy Manufacturing Company, Henry W. Oliver Building, Department C-58, Pittsburgh 22.*

"Old Maud," the first Mallet-type locomotive built in the United States, was placed in service by B&O in 1904. She had a single huge boiler which powered two sets of drivers turning independently of each other. These permitted her to develop a tractive effort of 71,500 and negotiate mountain curves with heavy payloads.

Then...and now...serviced with Esso Railroad Products

Valuable years of experience in research and development, along with continual testing on the road and in the lab, stand back of the outstanding performance of famous Esso Railroad Products.

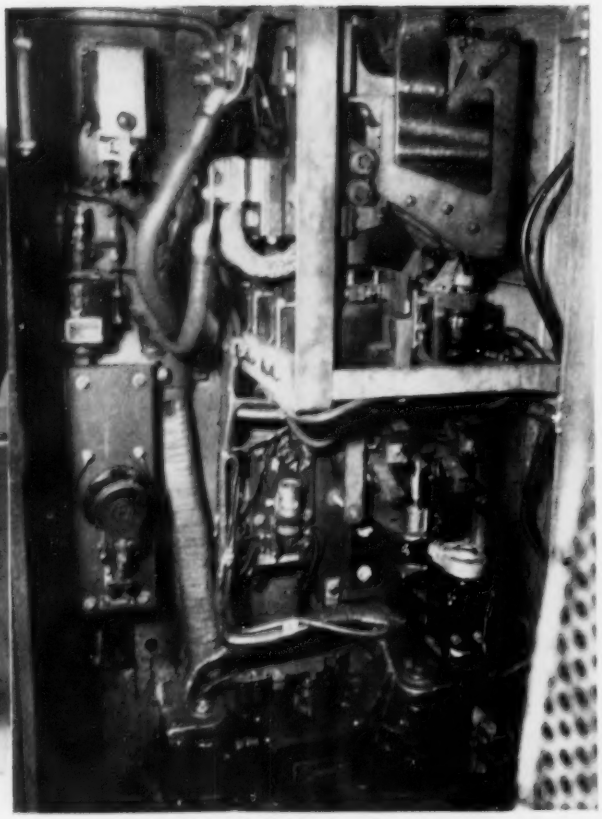
Diesel Fuels
ESSO ANDOK Lubricants—versatile greases
ARACAR—journal box oils
ARAPEN—brake cylinder lubricant
ESSO XP Compound—hypoid gear lubricant
DIOL RD—Diesel lube oil
COBLAX—traction motor gear lube
VARSOL—Stoddard Solvent
SOLVESSO—Aromatic solvent
ESSO Weed Killer
ESSO Hot Box Compound
AROX—pneumatic tool lube
CYLESSO—valve oil
ESSO Journal box compound
Asphalt
Cutting Oils
Rail Joint Compounds
Maintenance of Way Products
Signal Department Products
RUST-BAN — corrosion preventive

ESSO

RAILROAD PRODUCTS

SOLD IN: Maine, N. H., Vt., Mass., R. I., Conn., N. Y., N. J., Pa., Del., Md., D. C., Va., W. Va., N. C., S. C., Tenn., Ark., La.

ESSO STANDARD OIL COMPANY — Boston, Mass. — Pelham, N. Y. — Elizabeth, N. J. — Bala-Cynwyd, Pa. — Baltimore, Md. — Richmond, Va. — Charlotte, N. C. — Columbia, S. C. — Memphis, Tenn. — New Orleans, La.



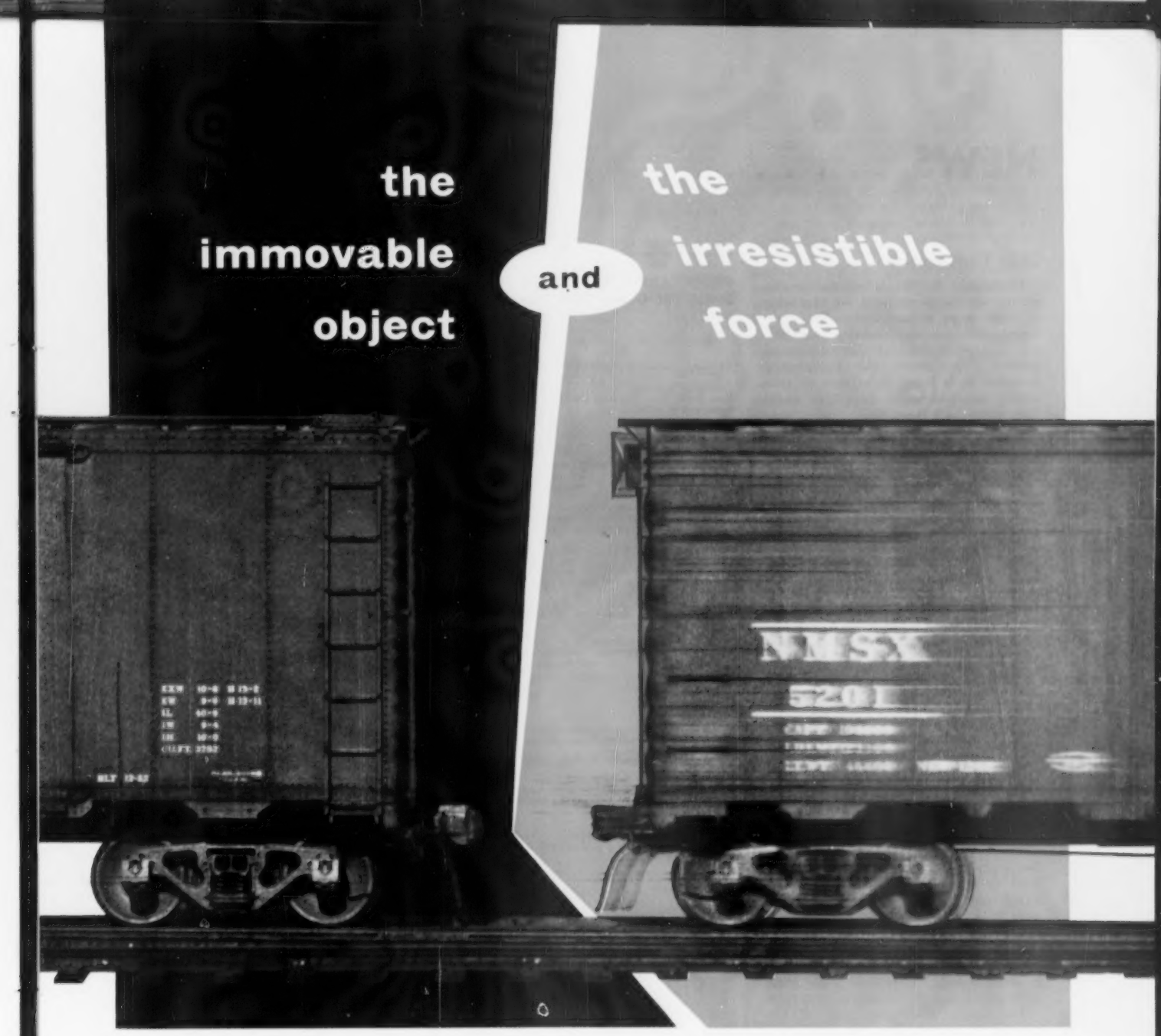
Simplex Diesel Locomotive Cable wears an *EXTRA TOUGH JACKET* against Abrasion, Heat, Water, Oil and Acids

- Simplex makes a cable for Diesel locomotives.
- It's insulated with a special rubber compound that heat won't crack or make brittle.
- It has a tough jacket that withstands abrasion, acids, heat, oil and moisture.
- Type A is built for use in conduits, cabinets and terminal boxes.
- Type B is for exposed locations. Type B is a sturdier cable with an extra heavy, reinforced jacket.

For detailed information, ask the Railroad Department at the address below

Simplex Diesel Locomotive Cable

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Mass.



National Rubber-Cushioned Draft Gears effectively cushion high impacts of coupling at today's 7 to 8 mph speeds. That's because National Rubber-Cushioned Draft Gears reduce forces acting on couplers and car structures.

These forces are measured and recorded by modern electronic equipment installed in actual cars on test tracks under *duplicated*—not "laboratory simulated"—operating conditions.

When you evaluate draft gear performance, *insist* on seeing results obtained under duplicated operating conditions. Drop-hammer and similar test methods tell only part of the story. National's test-track methods with electronic instrumentation tell it all. We're awaiting your invitation to show you the facts on draft gear comparative performance.

National Rubber-Cushioned Draft Gears give you protection when you need it—at high impact speeds!

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Cleveland 6, Ohio

COUPLERS • YOKES • DRAFT GEARS • FREIGHT TRUCKS • SNUBBER PACKAGES • JOURNAL BOXES and LIDS

NEWS

Shop Construction

Chesapeake & Ohio.—Plans and specifications are being prepared for expansion of diesel shops at Russell, Ky. The work, expected to cost approximately $400,000, will add about 50% to the capacity of present diesel repair and maintenance facilities. It is being undertaken in view of the enlargement in the C&O's diesel fleet which will result from receipt later this year of new locomotives now on order.

Chicago & Illinois Midland.—A diesel shop building costing $194,250 is under construction at Springfield, Ill.

All But 2% of Diesels Were Built Since 1940

More than 98% of the diesel-electric locomotives in service on Class I roads at the end of 1954 were built in the last 15 years.

According to an article in "Transport Economics," published by the Bureau of Transport Economics and Statistics, Interstate Commerce Commission, more than 54% were built in the five years ended in 1954.

The report states that there were 23,531 diesel-electric locomotives on Class I roads at the end of last year as against only 8,650 steam locomotives. This compares with 37,551 steam locomotives in service at the end of 1946 and 4,441 diesel-electric locomotives at that time.

Of the steam locomotives in service December 31, 1954, only 4.4% were built in the 10-year period ended then, 75.4% were built before 1930, and 25.9% were built before 1915. Under 1% were built since 1950. Of the diesel-electrics in service at the end of last year—amounting to 71.6% of the total of all locomotives in service—10.8% were built in the 1940-1944 period and 33.1% during 1945-1949.

The report also states that of 656 electric locomotives in service at the end of last year—representing 2% of all locomotives—about 85% were constructed before 1940.

Additionally, the report shows, the tractive effort of the various types of locomotives—measured in millions of pounds—has corresponded very closely to the numbers of locomotives in service.

Where steam locomotives accounted for 87.6% of locomotives in service in 1946, they supplied 87.1% of the tractive effort at that time. At the end of 1954, steam locomotives accounted for 26.3% of all locomotives and supplied 27.4% of the total tractive effort. Corresponding figures for diesel-electrics are 10.4% and 10.7% in 1946 and 71.6% and 70.4% at the end of 1954.

However, the report points out, "although the total number of locomotive units in service declined from 42,841 in 1946 to 32,872 in 1954, or a decrease of 23.3%, the total tractive effort was decreased only 14%."

ORDERS AND INQUIRIES FOR NEW EQUIPMENT PLACED SINCE THE CLOSING OF THE SEPTEMBER ISSUE

Diesel-Electric Locomotive Orders

Road	No. of units	Horsepower	Service	Builder
Atchison, Topeka & Santa Fe	36[1]	1,750	Freight	Electro-Motive
	10[1]	2,250	Road switch	Alco Products
Canadian National	3[2]	400	Road switch	Canadian General Elec.
New York, New Haven & Hartford	10[3]	1,200	Switching	Electro-Motive
Savannah & Atlanta	1	1,600	General-purpose	Electro-Motive
Southern Pacific	185[4]	.....	.....	Alco Products
				Electro-Motive
				Fairbanks, Morse
Spokane, Portland & Seattle	9[5]	1,600	Road switch	Alco Products
Utah	6[5]	1,750	Road switch	Electro-Motive
Wabash	1[6]	1,600	Road switch	Alco Products
Western Pacific	6[7]	1,750	Road switch	Electro-Motive
	8[8]	1,750	General purpose	Electro Motive

Electric Locomotives

Virginian	12[9]	3,300	Roadswitching	General Electric

Freight-Car Orders

Road	No. of cars	Type of car	Builder
Ann Arbor	100[10]	50-ton box	Pullman-Standard
Atchison, Topeka & Santa Fe	50[11]	Mechanical refrigerator	Company shops
Atlanta & West Point and Western of Alabama	100[12]	Box	Pullman-Standard
Baltimore & Ohio	1,000[13]	70-ton hopper	Bethlehem Steel
	500[13]	70-ton hopper	Pullman-Standard
	600[13]	Box	ACF Industries
	400[13]	Box	General American
Buffalo Creek	500[14]	Box	ACF Industries
	500[14]	Box	Pullman-Standard
Chicago & Eastern Illinois	200[15]	50-ton box	ACF Industries
	100[15]	50-ton box	Company shops
Chicago, Milwaukee, St. Paul & Pacific	100[16]	Cabooses	Thrall Car Mfg.
Erie	550[17]	Box	Greenville Steel Car
	500[17]	Box	General American
Illinois Central	2,000[18]	5-ton box	Company shops
Minneapolis, St. Paul & Sault Ste Marie	10[19]	70-ton gondola	Company shops
	30	70-ton covered hopper	Company shops
Missouri-Kansas-Texas	75[20]	70-ton covered hopper	Pullman-Standard
New York, Chicago & St. Louis	500[21]	50-ton box	General American
New York, New Haven & Hartford	500[22]	50-ton box	Pullman-Standard
Norfolk Southern	50[23]	50-ton gondola	Magor Car
	50[23]	50-ton pulpwood	Magor Car
Pennsylvania	100[24]	70-ton flat	Company shops
Southern Pacific	2,350[25]	Box	Company shops
	100[25]	50-ton pulpwood	Company shops
Union Pacific	200	Box	Company shops
	300	Auto box	Company shops
	50	70-ton covered hopper	General American
Wabash	50[26]	70-ton flat	Company shops
	100[26]	50-ton flat	Company shops
	500[26]	50-ton box	ACF Industries
	50[26]	70-ton gondola	Bethlehem Steel

Passenger-Car Orders

Road	No. of cars	Type of car	Builder
Canadian Pacific	3[27]	Rail diesel	Budd
Missouri-Kansas-Texas	1[28]	Rail diesel	Budd
Richmond, Fredericksburg & Potomac	2[29]	Coaches	Pullman-Standard

[1] Electro-Motive locomotives for delivery in second quarter of 1956; delivery of Alco locomotives expected to be completed this month.

[2] For early 1956 delivery.

[3] To cost in excess of $1,000,000. For delivery during December, January and February.

[4] Deliveries scheduled to begin in November and be completed in May. Most of the new units will be assigned to main-line freight service.

[5] Delivery of Alco units expected before the end of this year. Electro-Motive units scheduled for delivery early next year.

[6] Cost, $203,000. For delivery this month.

[7] Model GP-9 locomotives. For March 1956 delivery.

[8] Estimated cost, $1,488,000. To have been delivered last month.

[9] These are to be 197-ton, ignitron rectifier electric locomotives of the road-switcher type for delivery beginning in October 1956. The locomotives, with a C-C wheel arrangement and single cabs, control stations, and pantographs, are designed to operate on the Virginian's 11,000-volt, 25-cycle a-c catenary electric system. By using high-capacity rectifier tubes, the six traction motors per unit will have bridge type connection, giving the equivalent of motors in parallel with transitions eliminated over the complete operating range. Dynamic braking with retarding effect up to 63,000 lb at 25 mph is included in the locomotive design.

[10] PS-1 type, for delivery during March 1956.

[11] In addition to 150 ordered earlier this year. To be insulated for transporting frozen foods at temperatures of zero or lower. Original order expected to be completed this year; the additional 50, early in 1956.

[12] Half of these PS-1 cars will be 40½ ft long; the other half, 50½ ft. Cost, $710,000. Delivery expected late in second quarter of 1956. The roads have ordered 50 70-ton rebuilt gondola cars from the U.S. Railway Equipment Company at a cost of $173,000, for delivery this month. The roads are also converting in their own shops 100 box cars into wood rack cars.

[13] Deliveries expected during the first quarter of 1956.

[14] Cost of 1,000 cars, over $7,000,000. Road owned jointly by Erie and Lehigh Valley.

[15] Approximate cost of company-built cars, $10,000 each. Delivery expected during the second quarter of 1956.

[16] To be equipped with Duryea underframes. Deliveries to begin in November and continue for about three months.

ORDERS AND INQUIRIES (Continued)

[17] Cost of the Greenville cars, $6,937,500; the General American cars, $3,500,000. Five hundred of the Greenville cars for delivery early next year, to be equipped with "damage free" shoring devices, for shipping automobile parts and other freight. Delivery of the General American cars scheduled for second quarter of 1956.

[18] Estimated unit cost, $5,900.

[19] For delivery during first quarter of 1956.

[20] One hundred to be equipped with damage-free loading equipment. Scheduled for delivery in second quarter of 1956.

[21] Approximate cost, $600,000. Delivery scheduled for first quarter of 1956.

[22] The road in July announced its intention to purchase this equipment, at a cost of $4,000,000.

[23] Scheduled for delivery in February.

[24] An additional 275 70-ton open hopper cars will be purchased from a commercial builder. Of the total box-car order, 1,750 cars will be 50-ton, 50-ft, double-door cars; 250 will be of this type but equipped with boom-type automobile loading equipment; and 350 cars will be 50-ton, 50-ft, single-door cars equipped with "DF" loading equipment. The latter cars, in addition, will have the new hydra-friction underframe developed through joint research by the SP and Stanford Research Institute. An SP spokesman said this was the first mass-production order for the new type underframe which was described in the June issue, page 61.

[25] Company-built cars for delivery during first quarter of 1956; ACF cars, for delivery in April; Bethlehem Steel carts, for delivery in December.

[26] Each car to be equipped with roller-bearing trucks and rubber-cushioned draft gears.

[27] Delivered last month. The first unit is an all-passenger coach (RDC-1). One of the other two units, an RDC-2, will accommodate passengers and baggage. The third, an RDC-4, will carry mail and baggage only.

[28] Approximate cost of this RDC-3, $170,000.

[29] To be lightweight stainless steel. For delivery this year.

NOTES:

Boston & Maine.—The B&M directors have authorized purchase of 1,000 50-ton roller-bearing-equipped box cars at an approximate cost of $8,000,000. This is the largest single order for freight cars ever placed by the B&M, as well as its first purchase of freight cars equipped with roller bearings. Delivery is anticipated during the first quarter of 1956. The cars will be 50½-ft long, with 9-ft side doors.

Canadian Javelin, Ltd.—Canadian Javelin, of Montreal has been seeking prices for a minimum of 700 and a maximum of 1,100 100-ton gondola-type roller-bearing ore cars for delivery in the spring of 1957. The cars, which are to be similar to those now in use on the Quebec North Shore & Labrador, are for a new railroad which Javelin is building from a connection with the QNS&L to new ore deposits in the vicinity of Wabush Lake, Labrador.

Great Northern.—The GN is converting 24 flat cars into a special compartmentalized design to handle shipments of aluminum ingots between two separated plants of the Kaiser Aluminum & Chemical Corp. in the Spokane, Wash., area. The work is being carried out by GN shop forces at Hillyard (Spokane) shops. Each car will be capable of holding 28 ingots weighing 5,000 lb apiece. The design will permit loading the ingots with lift trucks.

Louisville & Nashville.—The L&N is installing "ride control packages" on 1,420 freight cars, replacing conventional AAR 1936 design freight car truck springs. Total cost will run to $291,100. The road also will replace, at a cost of $168,655, the sides and floors on 240 composite hopper cars with steel sides and floors.

SUMMARY OF MONTHLY HOT BOX REPORTS

	Foreign and system freight car mileage (thousands)	No. of cars set off between division terminals because of hot boxes			Miles car set off
		System	Foreign	Total	
June, 1951	2,874,873	7,074	15,376	22,450	128,057
June, 1952	2,672,513	8,466	14,495	22,961	116,394
1953					
June	2,926,001	8,537	15,296	23,833	122,771
July	2,925,317	9,342	15,775	25,117	116,467
August	2,971,020	8,638	14,160	22,798	130,319
September	2,822,222	6,083	10,195	16,278	173,376
October	3,042,558	3,863	6,493	10,356	293,796
November	2,788,773	1,987	3,404	5,391	517,301
December	2,656,063	1,581	2,550	4,131	642,958
1954					
January	2,583,485	3,082	3,797	6,879	375,561
February	2,445,214	2,953	4,066	7,019	348,370
March	2,658,757	2,196	3,637	5,833	455,813
April	2,570,518	3,079	5,149	8,228	312,411
May	2,713,511	4,416	6,510	10,926	248,353
June	2,662,375	6,597	9,617	16,214	164,202
July	2,678,234	7,956	10,912	18,868	141,946
August	2,696,135	7,568	9,742	17,310	155,756
September	2,614,432	6,710	8,882	15,622	167,355
October	2,852,825	5,182	6,985	12,167	234,472
November	2,717,219	2,515	3,467	5,982	454,232
December	2,751,644	1,501	2,294	3,795	725,070
1955					
January	2,714,070	1,813	2,701	4,514	601,256
February	2,517,483	2,266	3,970	6,236	403,701
March	2,830,398	2,717	5,076	7,793	363,197
April	2,787,705	3,471	6,485	9,956	280,002
May	2,931,850	4,860	8,664	13,524	216,788
June	2,945,955	6,080	10,226	16,306	180,666

Revenue Basis for Class I Roads Raised to $3 Million

The minimum annual-revenue requirement for designation as a Class I railroad will be increased from $1 million to $3 million, effective January 1, 1956. All roads with annual gross of less than $3 million will be Class II, so there will be only two classes instead of the present three.

The Interstate Commerce Commission has so ordered after considering views submitted by interested parties in response to the commission's notice of its intention to issue the order.

The new set-up will remove 13 roads from the Class I group, but it will bring in four which would now be in except for the fact that there have been no reclassifications for several years. The effect on aggregate annual revenue of the Class I group will be slight. The total for the new group is expected to be 0.11% less than that of the present group.

The four new Class I roads will be: Litchfield & Madison; Savannah & Atlanta; Minnesota, Northfield & Southern; Carolina & Northwestern.

The commission order stipulates that the classification shall be based on the average annual operating revenues for the three-year period ended with the calendar year 1955; "and, subsequently, if at the close of any calendar year the average of the annual operating revenues for the latest three-year period is greater or less than the amount applicable to the class in which the carrier has been reporting, its class for the second succeeding year shall change accordingly and it shall remain in such class for a period of not less than three consecutive years."

The order also provides that, in applying the classification to a switching and terminal company which is operated as a joint facility, the sum of the annual railway operating revenues, the joint facility rent income, and the returns to joint facility credit accounts in operating expenses, shall be used in determining the class."

MacDonald New Safety Chief

Francis C. MacDonald, new chief of the Section of Railroad Safety in the ICC's Bureau of Safety and Service, has been a member of the commission's staff since 1920. He was assistant chief of the section when he moved up September 1 to succeed Shirley N. Mills, retired.

After 17 years in railroad service, Mr. MacDonald joined the ICC as a field inspector of safety appliances at Chicago. In 1937 he was transferred to Washington, D.C., as inspector, accident investigation, later in the year becoming chief of the Accident Investigation Section. In 1938 he was named chief of the Safety Appliances Section and in 1954 became acting assistant director of the Bureau of Safety. When that bureau was merged into the present Bureau of Safety and Service, he was appointed assistant chief of the Section of Railroad Safety.

As successor to Mr. Mills, Mr. MacDonald has also been named assistant director of the Bureau of Safety and Service. He will reach retirement age this year.

Diesel Oil Purchases Up 10% in First Four Months

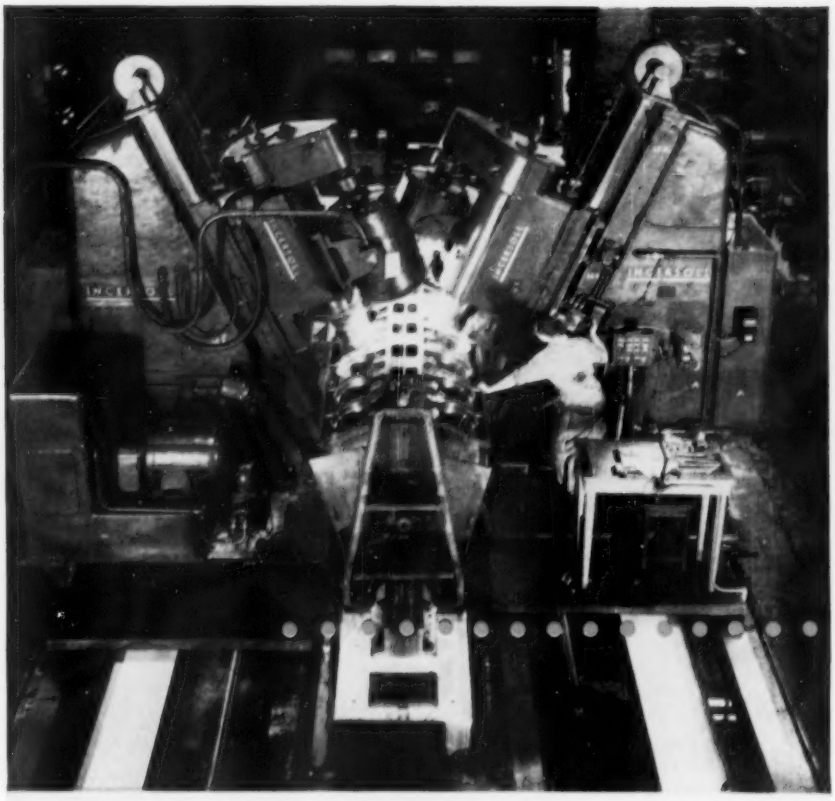
Purchases of diesel fuel in the first four months this year were 10% greater than in the same period in 1954, according to the July issue of "Transport Economics" of the Bureau of Transport Economics and Statistics, Interstate Commerce Commission.

Railroads purchased 1,141,888,000 gallons of diesel fuel in the 1955 period, as against 1,037,864,000 last year. Average cost per gallon of the oil declined by 1.1%—from 9.8 cents to 9.7 cents in the four-month period.

For the same period, the report states, coal purchases declined 18.5%, comparing 1955 with 1954. Class I roads purchased 5,402,000 tons of coal through April this year as against 6,619,000 last year. Of the 1955 purchases, 5,221,000 tons were bought at mines and 181,000 tons at places other than mines, against 6,472,000 tons and 147,000 tons, respectively, in 1954.

Average cost per ton of coal at the mines this year was $4.56, down 3.2%

(Continued on page 22)



Gulf Quality Lubricants safeguard costly equipment like this in the Electro-Motive Plant. Leading Gulf brands used here include Gulf Harmony Oil for hydraulic systems; Gulf Gem Oil for spindles; Gulfcrest Oil for turbines; Gulf Anti-Friction Grease, Gulf Precision Grease; Gulf HM Grease, Gulf High Pressure Grease, and Gulf Plastic Petroleum B for various grease lubricating applications.

The New York Central is one of scores of railroads that use Gulf Dieselmotive Oil for better lubrication of their Diesel locomotives and lower maintenance costs.

Gulf Quality Lubricants

help maintain production of Electro-Motive Diesels

in the plant

and contribute to top performance

on the rails

The Electro-Motive Division of General Motors at LaGrange, Illinois, has invested millions of dollars in equipment to produce the famous EMD Diesel locomotives for the nation's railroads. And they make sure that this huge investment is well protected by proper lubrication—largely with Gulf Quality Lubricating Oils and Greases.

When you see an EMD locomotive on the rails, there is a good chance it's lubricated with Gulf Dieselmotive Oil, the modern Diesel locomotive lubricant. This outstanding oil is used by practically every leading railroad in Gulf's marketing territory.

For specific lubrication information for your equipment—and for expert help on any problem that involves lubricants or lubrication—call in a Gulf Sales Engineer. He can help you discover opportunities for important savings in operating and maintenance costs. Write, wire or phone your nearest Gulf office.

GULF OIL CORPORATION • GULF REFINING COMPANY

GULF BUILDING, PITTSBURGH 30, PENNSYLVANIA

GULF

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

Are your freight cars collecting cobwebs . .

. or cash?

You can eliminate out-of-service time, due to decay damage, by constructing or repairing cars with Koppers Pressure-Treated Car Lumber

Railroad records show that a car with *untreated* wood members usually lasts for only five years . . . before it's sidetracked for costly repairs to the lumber. And it may be months before a damaged car is earning revenue again; for railroads tell us it's necessary to wait until enough bad-order cars have accumulated to make it worthwhile to open the carshop or a repair track.

Service Life Tripled!

So it's not surprising that so many railroads have switched to Koppers Pressure-Treated Car Lumber. This lumber gives good service, on the average, for seventeen years. It outlasts *untreated* lumber better than three-to-one.

Revenue Increased!

Construction or repair of decking, sills, lining and other car members with Koppers Pressure-Treated Lumber assures those extra years of in-service revenue. And don't forget: this *protected* wood makes possible huge savings in maintenance—not to mention the out-of-pocket costs for switching cars to and from shops.

FREE ANALYSIS OF YOUR LUMBER PROBLEMS!

Let us analyze your lumber problems and then discuss with you the savings that can be effected by using Koppers Pressure-Treated Car Lumber.

KOPPERS COMPANY, INC.

Wood Preserving Division, Pittsburgh 19, Pennsylvania

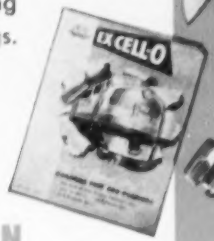
KOPPERS®

PRESSURE-TREATED CAR LUMBER

A MILLION MILES

Between Shoppings with EX-CELL-O Pins and Bushings

The longer wear from Ex-Cell-O hardened and ground steel pins and bushings means trouble-free service for your equipment — often over a million miles between shoppings. That's why more than 200 American railroads and equipment builders use Ex-Cell-O pins and bushings. Get long-run economy for your Diesel, steam, and passenger car equipment by standardizing now on Ex-Cell-O railroad pins and bushings.



For a complete listing of standard styles and sizes write today for new Ex-Cell-O Bulletin 32428.

RAILROAD DIVISION

EX-CELL-O CORPORATION

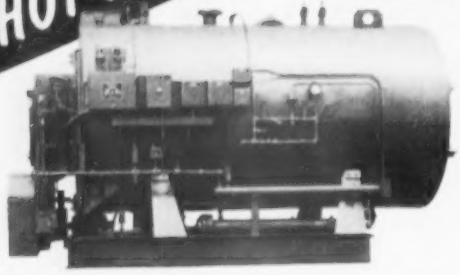
DETROIT 32, MICHIGAN

52-28

GET YOUR

STEAM and HOT WATER

. . . from a LOW COST PRODUCER!



***Continental* AUTOMATIC BOILER**

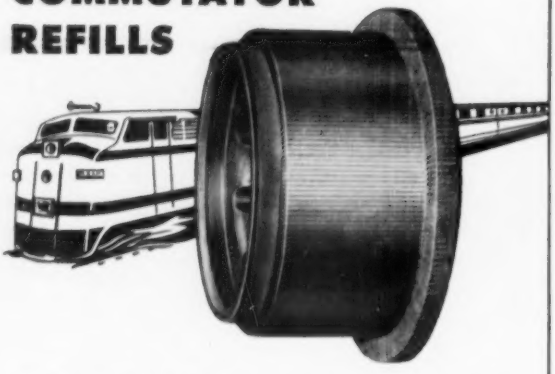
. . . generates the steam and hot water you need with low fuel costs and very little maintenance. It is highly efficient—over 80% guaranteed—because of its unique "spinning gas technique". Hinged doors can be opened by one man in less than ½ hour, so there's brief shut-down for cleaning and inspection. Simple, functional design and quality workmanship assure long service life. Sizes 20 to 500 hp, 15 to 250 psi. Gas, oil or combination fired. Write for Bulletin BE3-4.

Continental AUTOMATIC BOILERS

BOILER ENGINEERING *and Supply Company, Inc.*

14 Manavon St. • Phoenixville, Pa. • Phone 5832

DIESEL LOCOMOTIVE COMMUTATOR REFILLS



Expert refill work and fast service on all railroad commutators, including Diesel Locomotive Commutators. Commutators refilled by us give the best performance obtainable, as shown by their service on many of America's largest railroads. Write, wire or phone for quotations and delivery information. TOLEDO COMMUTATOR CO., OWOSSO, 3, MICHIGAN.

TOLEDO COMMUTATOR CO.

QUALITY PRODUCTS SINCE 1895

55

What is back of *wix* ENGINEERED FILTRATION

The research, analysis, testing techniques and engineering that go into a WIX Oil Filter Cartridge do not show in the outward appearance of the product. But they DO show where it counts...*in engine-saving performance.*

WIX engineers fully appreciate the cost factors of repairs, maintenance and down-time with diesel equipment. They maintain a continuing study of fuel and lube oil filtration with the result that many Railroads across America are turning to WIX for qualified assistance with their oil filtration problems.

Whether the service be yard, freight or passenger locomotives or maintenance-of-way equipment . . . or filtering fuel oil at transfer points and cleaning it for trouble-free injection . . . WIX Engineered Filtration provides cartridges tailored to fit the need.

ENGINEERED FILTRATION

The WIX Catalog is a *must* for you . . . contains FULL information on the right cartridge for your filters plus a handy cross-reference chart you'll want to have at all times. Write for it!

wix TRADE MARK REG.

ENGINEERED FILTRATION

WIX CORPORATION • GASTONIA, N. C.

WAREHOUSES

GASTONIA NEW YORK DES MOINES SACRAMENTO ST. LOUIS

NEWS

(Continued from page 15)

from the average cost of $4.71 last year. At places other than at mines, averaging cost per ton was $8.67 this year compared with $9.10 in 1954, a price drop of 4.7%.

Class I railroad purchases of fuel oil declined 21.1% in the period covered in the report, from 5,660,000 barrels in 1954 to 4,468,000 barrels this year. Gasoline purchases also dropped, by 2.5%, from 15,107,000 gallons last year to 14,733,000 this year, while purchases of electric current rose by 2.5% from 711,984,000 kilowatt-hours for the 1954 period to 729,777,000 kwh this year.

Average cost of fuel oil purchased during the four-month span rose by 5% this year, from $2.02 per barrel to $2.12 per barrel. Gasoline costs declined by 0.2% from 19.48 cents per gallon in 1954 to 19.45 cents this year, while electric current was down 3.4%, from 1.152 cents per kwh in 1954 to 1.113 cents per kwh this year.

New "RB" Type Freight Car Tested

An entirely new type of freight car designed to provide swift loading and unloading of "utilized" lading, has been built by International Steel Company, Evansville, Ind.

The "RB" type car (refrigerated car, without ice bunkers) was designed and built for a newly formed company, the Unit Load Car Corporation. It was service tested throughout September by the Calumet Industrial District Company, a food warehousing firm at Chicago.

Features of the new car include ten overhead garage-type doors, five to the side. The interior is divided into five compartments with permanent bulkheads, each compartment having a floor area of 69 sq. ft. The doors provide a 7-ft, 6-in by 9-ft, 3-in opening into each compartment.

New materials are widely used in the car. Floor, ceiling and bulkheads are of sandwich construction, using expanded Styrofoam for insulation. The lading floor is aluminum.

The built-in bulkheads are constructed of a steel framework in which sandwich panels are adhesively secured. These panels and the ceiling—are faced with polyester impregnated Fiberglas. The bulkheads are equipped with band anchors.

Primary purpose of this car is to facilitate loading and unloading of palletized lading with fork or lift trucks. It was designed by and built for a shipper. It is expected to reduce loss and damage claims; and it aims at elimination of dunnage or loose devices for securement of lading.

Use of the Styrofoam insulation and Fiberglas facings inside the car will, the designer believes, provide an odorless, moisture-proof, vermin-proof and corrosion-proof interior.

SELECTED MOTIVE POWER AND CAR PERFORMANCE STATISTICS

FREIGHT SERVICE (DATA FROM I.C.C. M-211 AND M-240)

Item No.		Month of June		5 months ended with June	
		1955	1954	1955	1954
3	Road locomotive miles (000) (M-211):				
3-05	Total, steam	5,781	5,852	30,649	38,214
3-06	Total, Diesel-electric	35,723	32,633	207,489	190,513
3-07	Total, electric	749	638	4,356	3,871
3-04	Total, locomotive-miles	42,460	39,267	243,741	233,190
4	Car-miles (000,000) (M-211):				
4-03	Loaded, total	1,705	1,497	9,702	8,869
4-06	Empty, total	933	897	5,399	5,218
6	Gross ton-miles-cars, contents and cabooses (000,000) (M-211):				
6-01	Total in coal-burning steam locomotive trains	13,088	11,997	70,845	74,904
6-02	Total in oil-burning steam locomotive trains	2,901	2,374	10,016	13,057
6-03	Total in Diesel-electric locomotive trains	101,971	90,542	585,333	525,596
6-04	Total in electric locomotive trains	2,359	2,007	13,371	11,934
6-06	Total in all trains	120,999	107,424	683,777	627,588
10	Averages per train-mile (excluding light trains) (M-211):				
10-01	Locomotive-miles (principal and helper)	1.03	1.02	1.02	1.02
10-02	Loaded freight car-miles	43.2	40.8	42.7	40.7
10-03	Empty freight car-miles	23.6	24.5	23.7	24.0
10-04	Total freight car-miles (excluding caboose)	66.8	65.3	66.4	64.2
10-05	Gross ton-miles (excluding locomotives and tender)	3,066	2,932	3,008	2,882
10-06	Net ton-miles	1,392	1,296	1,352	1,270
12	Net ton-miles per loaded car-mile (M-211)	32.2	31.7	31.7	31.2
13	Car-mile ratios (M-211):				
13-03	Per cent loaded of total freight car-miles	64.6	62.5	64.2	63.0
14	Averages per train hour (M-211):				
14-01	Train miles	18.5	18.5	18.8	18.8
14-02	Gross ton-miles (excluding locomotive and tender)	56,034	53,789	56,084	53,805
14	Car-miles per freight car day (M-240):				
14-01	Serviceable	48.7	43.3	46.1	42.1
14-02	All	46.0	40.7	43.4	39.8
15	Average net ton-miles per freight car-day (M-240)	958	868	883	781
17	Per cent of home cars of total freight cars on the line (M-240)	44.4	53.4	48.4	54.1

PASSENGER SERVICE (DATA FROM I.C.C. M-213)

3	Road motive-power miles (000):				
3-05	Steam	1,440	2,276	8,430	14,594
3-06	Diesel-electric	20,151	20,774	120,997	124,165
3-07	Electric	1,257	1,344	7,916	8,387
3-04	Total	22,854	24,394	137,349	147,146
4	Passenger-train car-miles (000):				
4-08	Total in all locomotive-propelled trains	236,088	246,413	1,391,665	1,469,434
4-09	Total in coal-burning steam locomotive trains	7,768	10,092	47,855	72,814
4-10	Total in oil-burning steam locomotive trains	5,847	10,964	23,842	51,079
4-11	Total in Diesel-electric locomotive trains	208,076	210,673	1,228,992	1,252,030
12	Total car-miles per train-miles	9.91	9.72	9.74	9.62

YARD SERVICE (DATA FROM I.C.C. M-215)

1	Freight yard switching locomotive-hours:				
1-01	Steam, coal-burning	300,900	306,628	1,597,896	1,923,611
1-02	Steam, oil-burning	60,774	60,638	268,477	323,427
1-03	Diesel-electric	3,612	3,263	20,909,384	19,511,002
1-06	Total	3,979,656	3,638,133	22,815,380	21,815,458
2	Passenger yard switching hours:				
2-01	Steam, coal-burning	7,112	10,938	54,306	76,807
2-02	Steam, oil-burning	5,482	5,112	30,234	26,589
2-03	Diesel-electric[1]	240,730	251,730	1,458,941	1,527,828
2-06	Total	278,618	292,725	1,696,998	1,790,594
3	Hours per yard locomotive-day:				
3-01	Steam	6.3	5.9	5.2	4.8
3-02	Diesel-electric	15.9	15.1	15.3	15.0
3-05	Serviceable	15.6	14.5	15.1	14.4
3-06	All locomotives (serviceable, unserviceable and stored)	13.9	12.5	13.2	12.3
4	Yard and train-switching locomotive-miles per 100 loaded freight car-miles	1.62	1.69	1.63	1.71
5	Yard and train-switching locomotive-miles per 100 passenger train car-miles (with locomotives)	0.73	0.74	0.75	0.75

[1]Excludes B and trailing A units.

PERSONAL MENTION . . . . . .

Chesapeake & Ohio

R. W. LLEWELLYN appointed master mechanic at Newport News, Va. Position of assistant master mechanic abolished.

Chicago & Eastern Illinois

Danville, Ill.

B. J. HUFF, master car builder, retired.

D. L. CRONKITE, assistant master car builder, appointed master car builder.

H. H. FARTHING, general car foreman at Yard Center, Ill., appointed assistant master car builder.

Elgin, Joliet & Eastern

PAUL H VERD appointed acting general manager at Chicago, with jurisdiction over the maintenance-of-way, maintenance-of-equipment, and transportation departments.

New York, Chicago & St. Louis

HAROLD LANDES appointed assistant car foreman at Gambrinus, Ohio.

Frankfort, Ind.

W. H. DUNN appointed roundhouse foreman.

LILBURN J. LIFE appointed assistant roundhouse foreman.

R. MARTIN appointed erecting shop foreman.

N Y C & St L (continued)

Brewster, Ohio

O. O. BROWN, JOHN BALTZER, F. W. BUEHLER, I. R. PETTAY, and C. E. FERGUSON appointed assistant car foremen.

New York Central

R. D. TIMPANY appointed acting master mechanic at Dewitt, N. Y.

New York, New Haven & Hartford

SAMUEL J. MASSEY, JR., appointed general manager, with jurisdiction over mechanical and engineering departments.

Mechanical department reorganized to improve locomotive reliability and functioning of air-conditioning apparatus as follows:

W. J. HARLOW, general mechanical superintendent, now general master mechanic, with jurisdiction over Division master mechanics and traveling master mechanic (a new position).

WILSON E. SYMONS, assistant general superintendent, now superintendent of equipment. Jurisdiction over car and locomotive cleaning supervisor, supervisor of apprentices, production supervisor, supervisor of car maintenance, inspection of passenger-train equipment and engineer of tests.

RUSSELL H. DAVIS, superintendent of car maintenance, now general shop superintendent. Jurisdiction over shops at Van Nest, N. Y., and Readville, Mass.

CARL L. HARTSHORN, assistant to the general mechanical superintendent, now superintendent of power plants and facilities. Jurisdiction over all power plants, machine-tool modernization, work method procedures, simplification and mechanization.

VIRGIL F. DOWDEN, assistant mechanical engineer, now electrical engineer. Responsible for, among other things, operation and performance of air-conditioning and equipment.

JOSEPH M. QUINN, assistant superintendent of car maintenance, now supervisor of car maintenance.

GEORGE J. HIGGINS, assistant to general mechanical superintendent, now traveling or acting master mechanic, with headquarters at Stamford, Conn.

Norfolk & Western

L. M. NEWTON appointed assistant road foreman of engines at Bluefield, W. Va.

F. H. WILBOURNE, assistant road foreman of engines, Radford division, transferred to Shenandoah Division.

P. C. CABINESS appointed assistant road foreman of engines, Radford division.

Pittsburgh & West Virginia

F. N. LUSCHER appointed road foreman of engines.

THOMAS MCCREADY appointed assistant road foreman of engines.

Southern Pacific

Stanley M. Houston

STANLEY M. HOUSTON appointed general superintendent motive power at San Francisco, as noted in the September issue. *Born:* Albuquerque, N. M., June 5, 1898. *Education:* Correspondence and night schools; Stanford Graduate School of Business; *Career:* Became a machinist apprentice on the Arizona Eastern (now SP) on April 1, 1913. Subsequently served as a machinist, roundhouse foreman, general foreman, and master mechanic at various locations on the SP; and as shop superintendent, superintendent of motive power, and assistant general manager of the Southern Pacific of Mexico. In May 1937 he returned to the United States, becoming successively assistant master mechanic of the SP at Oakland, Cal.; master mechanic; assistant superintendent motive power at Los Angeles,, and, in 1942, assistant general superintendent motive power.

Seaboard Air Line

W. J. SUBER, road foreman of engines at Norlina, N. C., appointed shop superintendent, Jacksonville shops, with jurisdiction over mechanical department matters at Baldwin, Fla.

Southern

Columbia, S. C.

GEORGE A. FLOYD appointed foreman enginehouse (day).

CAREY W. FUTCH, JR., appointed foreman enginehouse (night).

Atlanta, Ga.

HAROLD K. TUBBS, JR., appointed assistant foreman roundhouse.

BENJAMIN B. JONES, JR., appointed foreman car inspectors.

Union Pacific

WILLIAM PARRY appointed engineer locomotive construction and maintenance at Omaha, Neb. Formerly master mechanic of the Western Pacific at Elko, Nev.

J. J. CARROLL, general foreman at Omaha, Neb., appointed shop superintendent at Salt Lake City.

SUPPLY TRADE NOTES . . . . . .

BALDWIN-LIMA-HAMILTON CORPORATION.—*E. H. Schoonmaker*, manager of the St. Louis sales office, has been appointed eastern district sales manager, at New York. He has been succeeded at St. Louis by *W. A. McKnight* of the Houston office.

■

TIMKEN ROLLER BEARING COMPANY.—*John Rundt* has been appointed chief engineer, division of research and development.

■

NATIONAL ALUMINATE CORPORATION.—*Robert G. Bielenberg*, manager of transportation service, has been named assistant vice-president of the transportation division.

■

COMBUSTION ENGINEERING, INC.—*Frank J. Bader*, district manager, at San Francisco, has been appointed assistant general sales manager at New York. *Herman C. Reichard* has been transferred from the Kansas City sales office to succeed Mr. Bader at San Francisco.

■

VAN DER HORST CORPORATION.—*Van der Horst* has purchased industrial property at 2610 South Shields avenue, Chicago, consisting of 37,000 sq ft of manufacturing facilities and 15,000 sq ft of yard space. It will establish a plant there, which is expected to be in production early in 1956.

■

ARMCO STEEL CORPORATION.—*Paul F. Pardonner*, assistant manager of the Detroit sales district, has been named manager, succeeding *R. L. Shugg*, who will continue with the company in a consulting capacity.

■

INDUSTRIAL BROWNHOIST CORPORATION.—*Max Riebenack, III*, executive vice-president, has been elected president. *Stanley R. See*, director of sales for the eastern region, has been named vice-president and assistant to president.

■

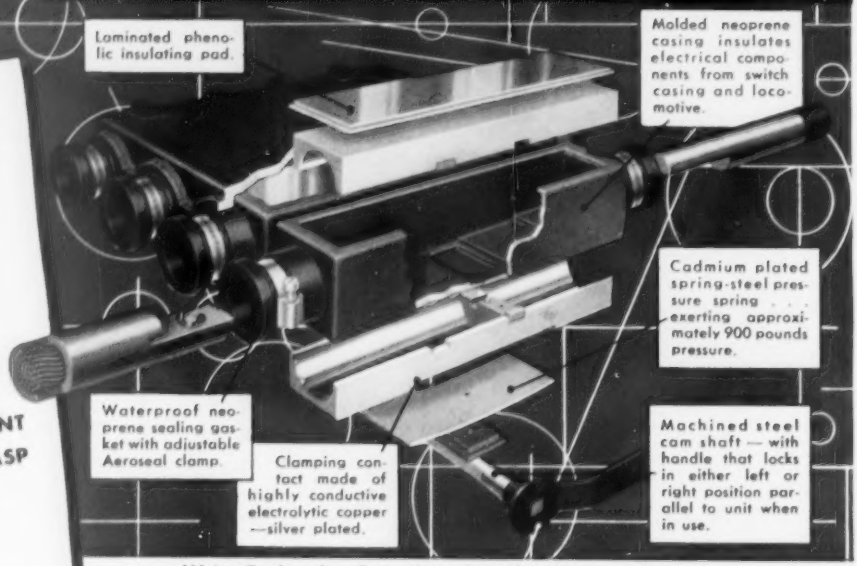
GREENVILLE-EVANS COMPANY.—Greenville-Evans Company, jointly owned by the Greenville Steel Car Company and Evans Products Company, has been formed to rebuild and upgrade railroad rolling stock. The operation will include purchase of old cars; reconditioning and modern-

(Continued on page 90)

A TIME SAVING . . . MECHANICAL PRESSURE QUICK-DISCONNECT SWITCH

Reduces Mechanical Maintenance Costs

- ★ SAVES HOURS ON INSPECTIONS & MAINTENANCE
- ★ NO SERVICING REQUIRED
- ★ LASTS FOR LIFE OF LOCOMOTIVE
- ★ FITS ALL PRESENT EQUIPMENT
- ★ USES PRESENT CLASP CONNECTIONS
- ★ POSITIVE MECHANICAL CONNECTION
- ★ SELF CONTAINED & WEATHERPROOF


Laminated phenolic insulating pad.
Molded neoprene casing insulates electrical components from switch casing and locomotive.
Cadmium plated spring-steel pressure spring . . . exerting approximately 900 pounds pressure.
Waterproof neoprene sealing gasket with adjustable Aeroseal clamp.
Clamping contact made of highly conductive electrolytic copper —silver plated.
Machined steel cam shaft — with handle that locks in either left or right position parallel to unit when in use.

Write Today for Complete Specifications and Performance Data.

TORMAN CO.

8119 LAKE STREET • RIVER FOREST, ILLINOIS

How Metallizing saves money in railroad shops

"Cold" metal build-up helps beat skyrocketing replacement costs—speeds maintenance jobs

Typical Railroad Metallizing Applications

Engine crankshafts, mains, throws, fits • Engine cylinders, liners, liner flutes • Water jackets, camshaft bearings • Generator, traction motor, other armature shaft bearing fits • Compressor crankshafts • Traction motor end housings • Pump rods and shafts • Eroded or corroded portions of engine blocks • Car lighting generator pulleys • Dents and scratches in car bodies

—practically any worn part repaired at only 15 to 20% replacement cost—get equipment back in service in hours, instead of days or weeks.

Some of the 28 major railroads using Metallizing:

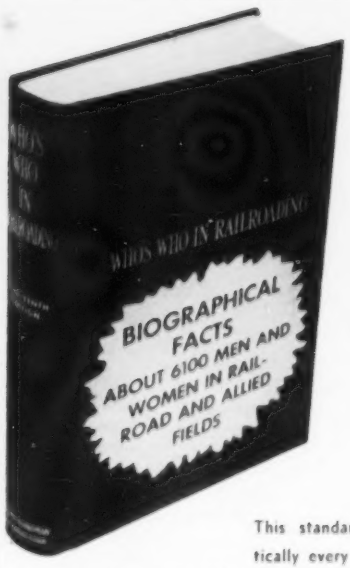
A.T. & S.F.	Missouri Pacific	Baltimore & Ohio
New York Central	Northern Pacific	Canadian National
Atlantic Coast Line	Pennsylvania	Chesapeake & Ohio

SPECIAL RAILROAD BULLETIN AVAILABLE—illustrates and describes a number of these time-saving, money-saving metallizing applications. Data supplied by railroads using metallizing; photographs taken in user shops. Write for copy.

Metallizing Engineering Co., Inc.

1117 Prospect Ave., Westbury, L. I., New York • cable: METCO

In Great Britain: Telephone: EDGEWOOD 4-1300
METALLIZING EQUIPMENT COMPANY, LTD.—Chobham near Woking, England



Only Book of FACTS about Railroaders

13th Edition

This standard work includes practically every U.S. and Canadian railroader with a responsible position (plus prominent men in the supply field). It has been thoroughly revised and lists about 2,000 men who were not in the last edition. Every railroad executive or supplier needs it. Order your copy today—price only $14.00, postpaid. Money refunded in 10 days if you are not satisfied.

RAILWAY AGE BOOKS

30 Church St., New York 7, N.Y.

GET BETTER-LOOKING TRUCKS AND UNDERFRAMES

with brand-new PENNSALT CLEANER 50

For the toughest, hardest-to-remove soils on trucks, underframes, wheels, oil tanks, here's the best answer yet—from Pennsalt's Whitemarsh Research Laboratory . . .

PENNSALT CLEANER 50 is a heavy-duty, balanced alkaline detergent that penetrates all the varied soils picked up throughout the country, loosens the most stubborn deposits for easy rinsing off.

IN EVERY TEST Pennsalt Cleaner 50 has consistently produced a *higher percentage* of clean trucks than any other material or combination of materials tried. It needs no babying—it works in hot or cold solutions, in spray units, in automatic washing equipment, or with a plain bucket and brush.

TRY NEW PENNSALT CLEANER 50 on locomotives from different runs. See how road dirt, oils, greases wilt under its penetrating attack. Call your Pennsalt service man for a demonstration, or write Railroad Maintenance, Pennsylvania Salt Manufacturing Company. EAST: Three Penn Center Plaza, Philadelphia 2, Pa.; WEST: Woolsey Building, 2168 Shattuck Avenue, Berkeley 4, California.

Favorite of the men in the shops . . .

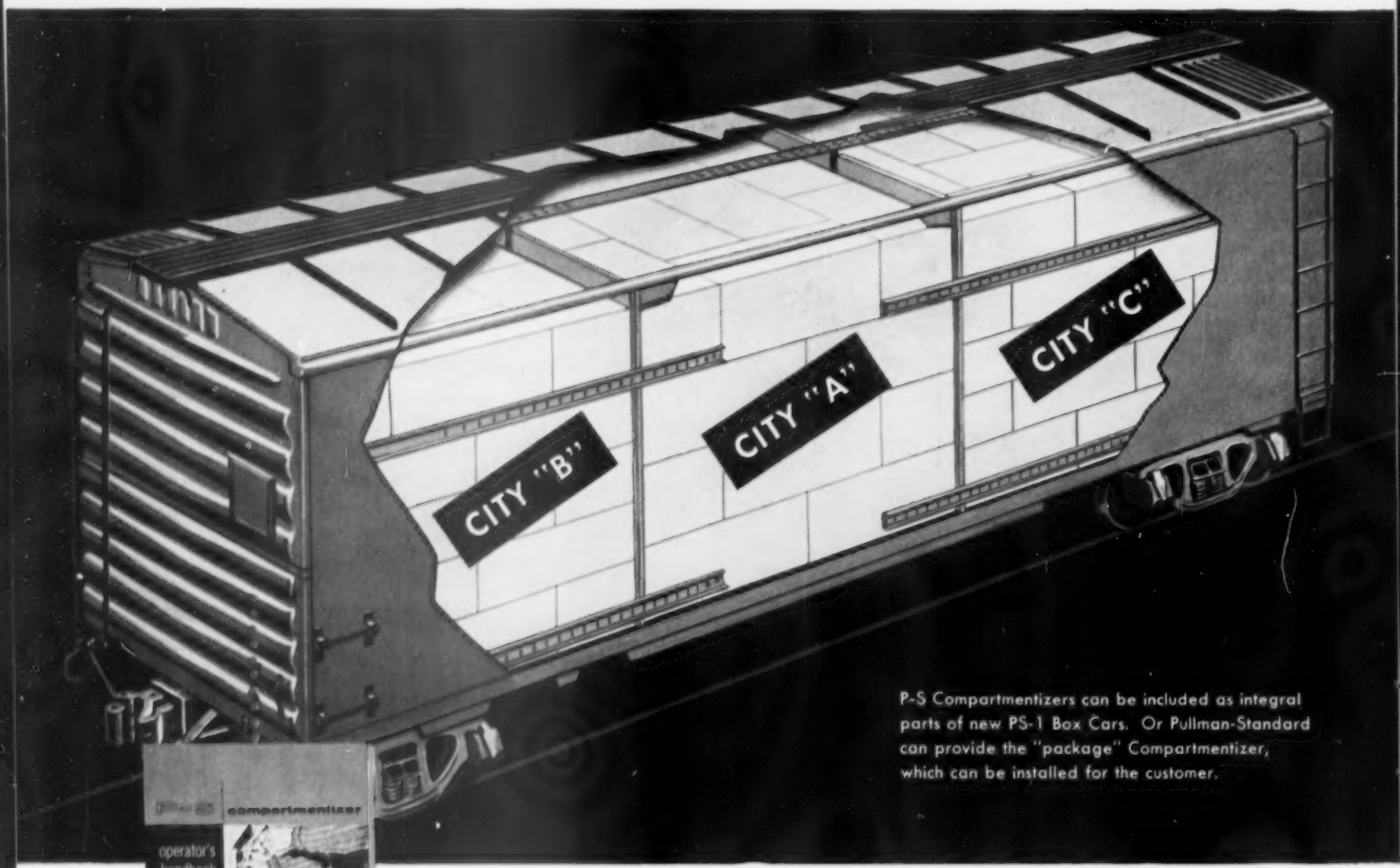
Pennsalt Chemicals

PENNSYLVANIA SALT MANUFACTURING COMPANY • Philadelphia, Pa.

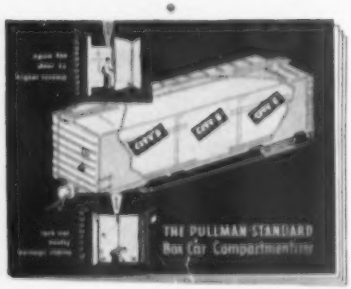
NOW

P-S Compartmentizer

- **Protects lading, reduces damage claims.**
- **Speeds handling, prevents pilfering and mix-up.**
- **Builds freight traffic revenues.**



P-S Compartmentizers can be included as integral parts of new PS-1 Box Cars. Or Pullman-Standard can provide the "package" Compartmentizer, which can be installed for the customer.



The P-S Compartmentizer is proving to exert powerful control over the lading damage frequency and severity claims that cost railroads more than $111,000,000 a year. And this new device has ranged itself alongside the other Pullman-Standard lading damage prevention products—the Cushion Underframe and the Lading Strap Anchor—that are successfully safeguarding shipments all along the roads of the Great American Railway System.

The P-S Compartmentizer offers added benefits to railroads and shippers. Examples? Its two pairs of rugged steel gates can be used to lock in and segregate lading, preventing pilfering, mix-up and error. A consignment destined for City "A" can be handled without disturbing shipments to Cities "B" and "C". And the Compartmentizer speeds handling and protects lading for Full Car Load, LCL or Stop-off. Mobility of the gates allows positioning tight against the face of the load, reducing needs for costly dunnage. And the device allows many shippers to fill box cars to the roof for up to 15,000 lbs. added volume.

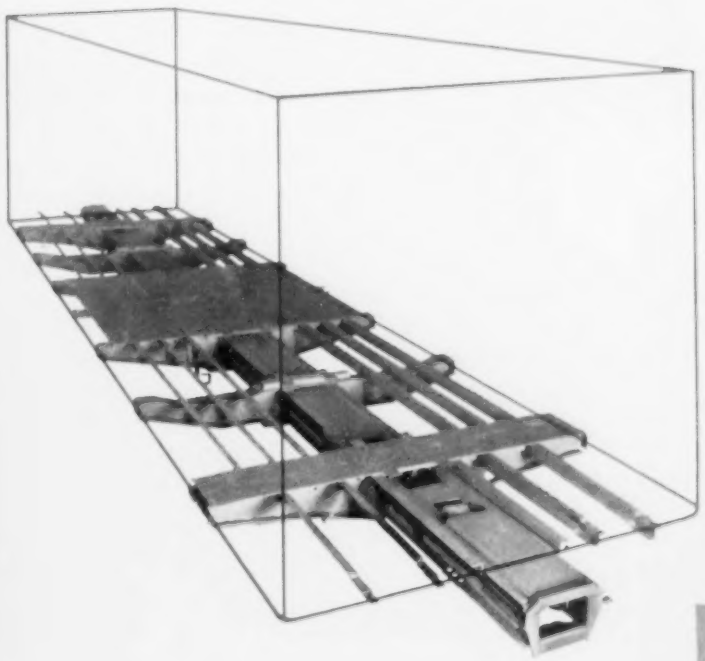
Thus, one of the P-S Compartmentizer's most outstanding advantages is its ability to earn shipper preference and build added freight traffic revenues.

Pullman-Standard has prepared detailed literature on the Compartmentizer. Write for your copies. A Sales Representative will call for a personal discussion, if you wish.

NOW

P-S Cushion Underframe

- **Protects *both* car and lading.**
- **Dampens shocks, even under "collision" impacts.**
- **Low cost and maintenance. Builds high revenue.**



Offering more cushioning capacity than any other device on the market, the P-S Cushion Underframe is proving its ability to perform important damage prevention functions for both the car and its lading.

The P-S Cushion Underframe is now serving or on order in 547 box cars on 10 lading damage prevention conscious roads of the Great American Railway System.

The Cushion Underframe is designed to utilize the sliding sill principle with a built-up rubber cushion mechanism at the center of the car. After conventional draft gears reach their capacity under about 5 mph impacts the Cushion Underframe takes over the shock dampening job. In-service and laboratory tests are proving the P-S Cushion Underframe gives important protection to both car and lading even at "collision" level impacts of up to 10 mph.

We would like to provide you with complete details on this important lading and rolling stock saving device. Write for informative literature. If you prefer, a qualified Sales Representative will call for a personal discussion.

YOUR NEEDS CREATE THE PULLMAN "STANDARD"

PULLMAN-STANDARD

CAR MANUFACTURING COMPANY

SUBSIDIARY OF PULLMAN INCORPORATED

79 EAST ADAMS STREET, CHICAGO 3, ILLINOIS

BIRMINGHAM, PITTSBURGH, NEW YORK, SAN FRANCISCO, WASHINGTON

This employee needs only minutes to replace a worn hose on this hydraulic tie puller using Aeroquip hose and reusable fittings.

Aeroquip hose lines are used on this diesel locomotive. This workman is re-installing hose lines after the engine unit was removed for servicing.

Southern Pacific Cuts Replacement Costs with Flexible Hose Lines

Southern Pacific maintenance men often rely on Aeroquip hose lines for quick, low-cost replacement. Using Aeroquip bulk hose and reusable fittings, SP employees can make flexible hose lines when they are needed.

On some Southern Pacific installations, Aeroquip flexible hose lines are used to replace rigid piping. In addition to giving longer service, maintenance time is reduced and equipment servicing is made easier.

It is possible to simplify your replacement problems on fuel, lube oil, water, air and air brake lines with Aeroquip. Write for full information.

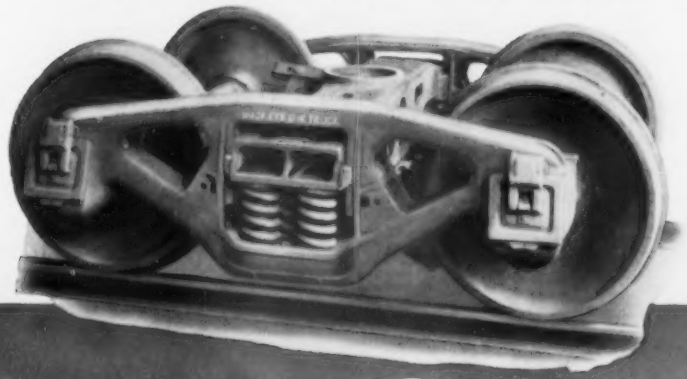
Aeroquip

REG. TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

LOCAL REPRESENTATIVES IN PRINCIPAL CITIES IN U.S.A. AND ABROAD • AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

FOR EFFECTIVE 'CUSHIONING' ACTION BETWEEN LADING AND ROADBED . . .



Buckeye CR.

(Cushion Ride) TRUCKS

. . . include the best combination of time-proven features and modern improvements.

- Integral box side frames with Buckeye inverted U-Section tension members.
- Full box-section bolster ends protected by hardened steel wear plates.
- Most effective control of alignment, and vertical and lateral motion provided by simple, durable parts.
- Symmetrical friction wedges of hardened cast steel with full width, long wearing bearing surfaces.
- Low rate friction wedge springs for uniform action over a long period of service.
- Easy visual inspection of "cushioning" control parts.
- Easy to assemble and dismantle.
- Superior riding qualities and long, maintenance-free service.
- Buckeye uniplane jig grinding standard on lid faces of all integral box side frames.

FOR COMPLETE INFORMATION . . CALL OR WRITE

Refer Ads No. 11827

Ask for Bulletin No 201. .

The Buckeye Steel Castings Co.

★ COLUMBUS, O.
★ NEW YORK, N.Y.
★ CHICAGO, ILL.
★ ST. PAUL, MINN.

NEW!

SINCLAIR JET LUBE POLY-BAGS

...Greatest Advance in Traction Motor Gear Lubrication History!

All the Advantages of famous JET Lubricant-TM
...Now available in Expendable Polyethylene Bags

Just Drop the 1-pound Jet Lube Poly-Bag into Gear Case – Bag Disintegrates and Becomes Part of the Grease Mass.

Tests by manufacturers and railroads prove you get:

- ***Savings in Labor Costs***
- ***Clean, Easy Handling***
- ***More Miles per pound***
- ***Assurance the job will be done***

SINCLAIR RAILROAD LUBRICANTS

For further information, contact Sinclair Refining Company, Railway Sales, New York, Chicago, St. Louis, Houston.

Save Lading Save Labor!

WITH M-F WATER-TIGHT BOLTS

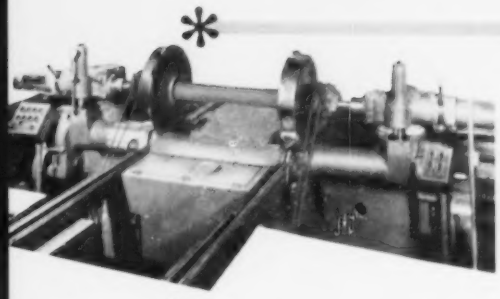
A flat, *flush* surface—*safe* for packaged or bagged lading—yet this added protection actually costs less *originally* (because the M-F Water-Tight Bolt requires no countersinking) and cuts car maintenance, too! (Because the water-tight ring prevents entrance of moisture and decay.)

MAC LEAN-FOGG *Lock Nut Company*

5535 NORTH WOLCOTT AVENUE, CHICAGO 40, ILLINOIS *In Canada:* THE HOLDEN CO., LTD., MONTREAL

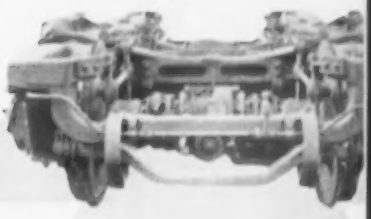
LOCK NUTS • WATERTIGHT BOLTS • SPECIAL BOLTS • FLOOR CLIPS • LADING STRAP ANCHORS • STAMPINGS • STANDARD NUTS • THUMB SCREWS • TOOLS • DIES • PRESSED METAL PRODUCTS

the Standard WHEEL TRUING MACHINE for ALL WHEEL WORK



From a locomotive to a pair of mounted wheels, the **Standard** Wheel Truing Machine is equipped to handle *all* truing jobs.

One man operation by push button controls. The **Standard** Wheel Truing Machine eliminates the costly delay of dropping trucks and removing wheel and axle assemblies for turning of wheels. The **Standard** Wheel Truing Machine is the most efficient method for restoring wheels to contour for cars or locomotives, whether on *or off* the equipment.



Standard *RAILWAY EQUIPMENT MANUFACTURING COMPANY*

GENERAL OFFICE: 4527 Columbia Avenue, Hammond, Indiana

New York • Chicago • St. Paul • San Francisco

Standard *Railway Equipment Manufacturing Co., (Canada) Ltd.*

Sun Life Building, Montreal

New, *Luxurious* Astra-Dome Cars

all equipped with

Commonwealth

DOME COACH

DOME DINER

DOME
OBSERVATION LOUNGE

Built by ACF
Industries, Inc..
St. Charles, Mo., Plant

GENERAL STEEL

for the UNION PACIFIC *Domeliners*

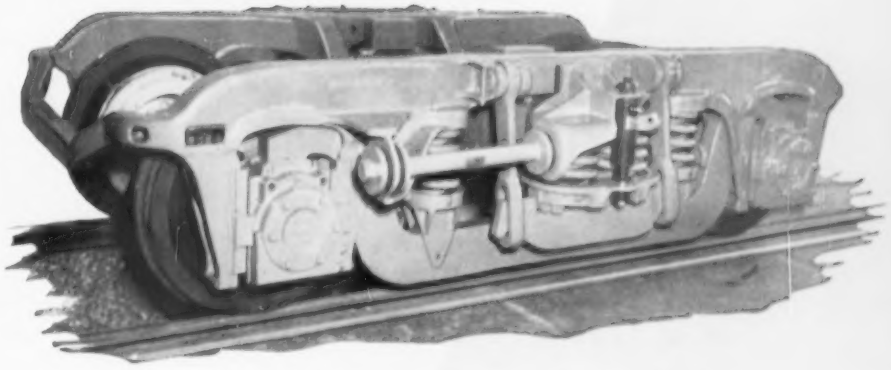
Outside Swing Hanger Type Trucks

and Underframe End Castings

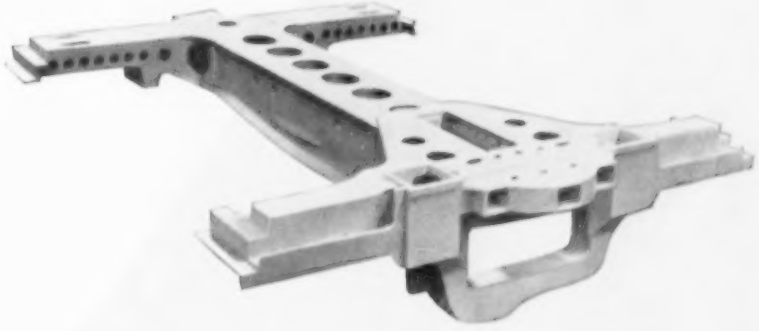
To assure maximum riding comfort, new Domeliner trains on the Union Pacific Railroad feature Commonwealth *Outside Swing Hanger Trucks* with *Central Bearings*. These latest type trucks not only provide smooth riding but simplify inspection and greatly reduce maintenance expense.

Strong, Commonwealth one-piece cast steel *Underframe End Castings* with integral body bolsters and end sills provide exceptional strength and passenger safety, and eliminate maintenance.

Passenger traffic is attracted by the most modern equipment. For your new cars, specify these Commonwealth Products.



Outside Swing Hanger Truck with Central Bearing



One-Piece Underframe End Casting

CASTINGS

GRANITE CITY, ILLINOIS
EDDYSTONE, PA.

GAIN THESE ADVANTAGES with MET-L-WOOD

METAL BONDED TO PLYWOOD

for new and rebuilt Passenger Car Interiors

FAST ASSEMBLY with Met-L-Wood, whether you fabricate in your shops or use prefabricated Met-L-Wood panels made to your exact specifications.

LIGHT WEIGHT Met-L-Wood panels can reduce weight to as low as 27% of the weight of comparable steel construction.

SOUND-DEADENING value of Met-L-Wood reduces outside noise levels, and is particularly valuable as sound-isolation when used for compartment partitions and doors.

VIBRATION DAMPING effect of Met-L-Wood helps prolong car life — gives passengers extra comfort.

and Smooth, Durable Beauty!

Whether plastic, painted steel, stainless steel, or aluminum, the smooth sweep of Met-L-Wood panels adds beauty to any car interior. Tough, abuse-resisting surfaces keep car interiors new-looking for years.

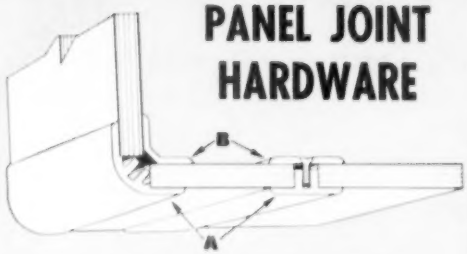
Details and technical data on Met-L-Wood panels, doors and partitions will be sent promptly on request.

Write for Bulletins 520 and 521

MET-L-WOOD CORPORATION

6755 West 65th Street, Chicago 38, Illinois

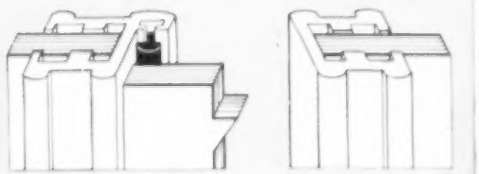
PANEL JOINT HARDWARE



Met-L-Wood panels can be joined quickly and easily with these trim extruded aluminum units. Strips A have grooved slots which provide strong threads for standard 10-24 machine screws anywhere along the length. Strips B can be drilled for screws at convenient points along the panel joint.

PANEL EDGE FITTINGS

Extruded aluminum fittings for Met-L-Wood panel edges improve partition and door appearance and give permanent edge protection. Left below is the fitting for door stops. Keyed slot holds molded rubber bumper firmly and permanently. At right is edge fitting for sliding doors and partition edges. Both fittings are easy to install on Met-L-Wood panels.



NATIONAL CARBON COMPANY has always recognized the specialized nature of diesel-electric locomotive service. No other set of operating conditions in rotating equipment duplicates those of diesel-electric traction motors, generators and auxiliaries. That's why National Carbon was first with large-scale research and development work on brushes *specifically* formulated for railroad services.

The railroads' interest in—and close cooperation with—this development program have paid handsome dividends—in ever-increasing miles per dollar spent for brushes and for commutator and other maintenance, as well as virtual elimination of mechanical brush failures.

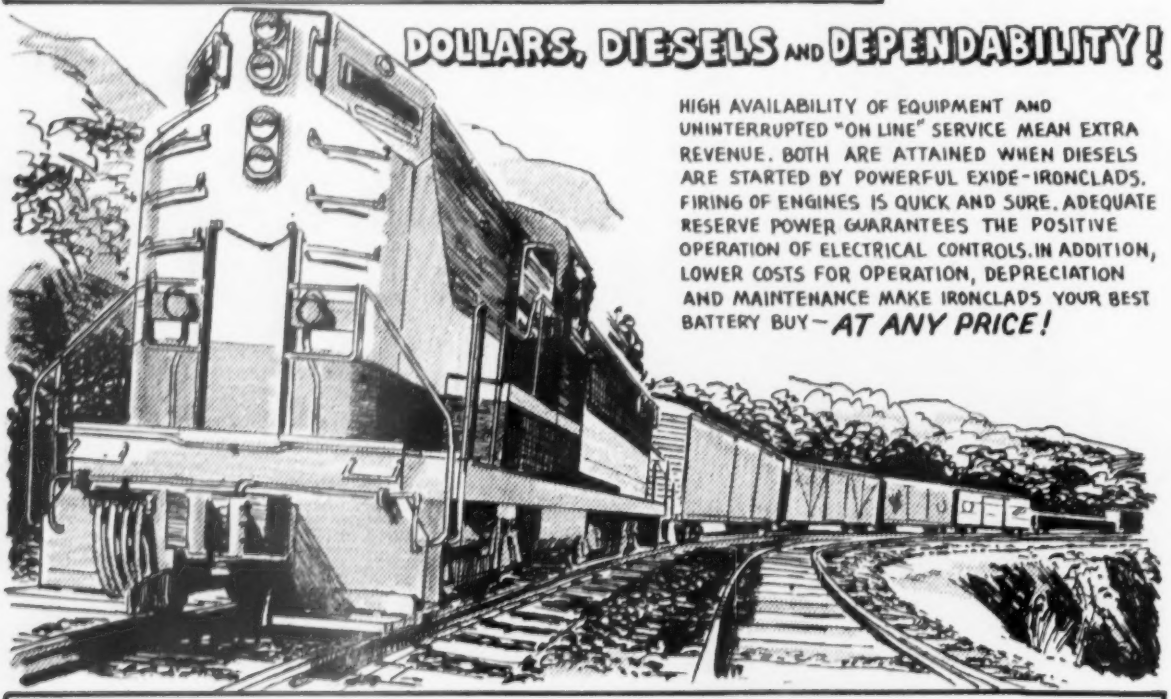
No wonder far more "National" brushes are used in diesel-electric locomotive application than all other brands combined! Prove to yourself that you go *farther* with "National" brushes — for *less*.

The term "National", the Three Pyramids Device and the Silver Colored Cable Strand are registered trade-marks of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N.Y.

SALES OFFICES: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco
IN CANADA: Union Carbide Canada Limited, Toronto

FACTS ABOUT Exide®
IRONCLAD® DIESEL STARTING BATTERIES

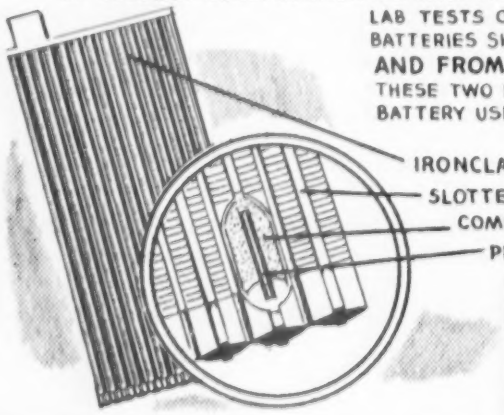


DOLLARS, DIESELS AND DEPENDABILITY!

HIGH AVAILABILITY OF EQUIPMENT AND UNINTERRUPTED "ON LINE" SERVICE MEAN EXTRA REVENUE. BOTH ARE ATTAINED WHEN DIESELS ARE STARTED BY POWERFUL EXIDE-IRONCLADS. FIRING OF ENGINES IS QUICK AND SURE. ADEQUATE RESERVE POWER GUARANTEES THE POSITIVE OPERATION OF ELECTRICAL CONTROLS. IN ADDITION, LOWER COSTS FOR OPERATION, DEPRECIATION AND MAINTENANCE MAKE IRONCLADS YOUR BEST BATTERY BUY—*AT ANY PRICE!*

BATTERIES ARE WORKED TO DEATH BY EXIDE ENGINEERS TO LEARN SECRETS OF LONGER LIFE

SINCE 1910, RESEARCHERS HAVE GREATLY IMPROVED EXIDE-IRONCLAD PERFORMANCE AND USEFUL WORKING LIFE, BUT THE BASIC IRONCLAD PRINCIPLE OF TUBULAR CONSTRUCTION REMAINS THE SAME.



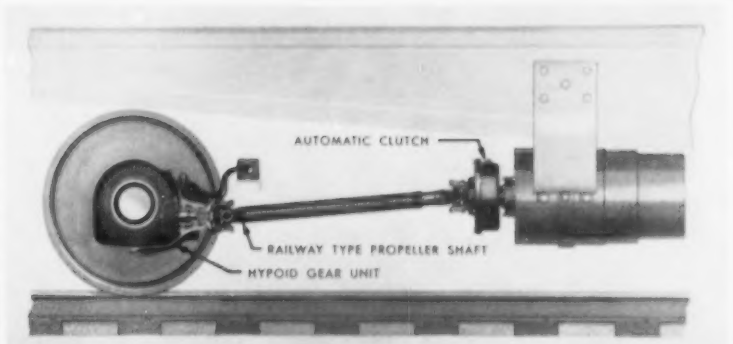
LAB TESTS OF IRONCLADS AGAINST CONVENTIONAL TYPES OF BATTERIES SHOW THAT THEY GIVE BETTER PERFORMANCE...
AND FROM 20% TO 30% LONGER LIFE!
THESE TWO FACTS, DEMONSTRATED BY THOUSANDS OF BATTERY USERS, ARE THE REASON WHY...

EXIDE-IRONCLADS
ARE YOUR BEST POWER BUY
AT ANY PRICE!

LET EXIDE HELP SOLVE YOUR DIESEL STARTING BATTERY PROBLEM ❶ CALL AN EXIDE SALES ENGINEER FOR FULL DETAILS. ❷ WRITE FOR FORM 4843-ALL ABOUT MAINTAINING AND INSTALLING DIESEL STARTING BATTERIES.

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

OVER 11,000



Spicer Railway Generator Drives

now in use by more than 70 railroads

– a record unequalled by any other similar unit!

Spicer

DANA CORPORATION • TOLEDO 1, OHIO

"You Get Extra Battery Performance –

America's Finest!
GOULD KATHANODE
BATTERIES
for Air Conditioning
and Car Lighting

THANKS TO GOULD FIELD ENGINEERING SERVICE!"

It's a proven fact that regular, systematic battery care can add months, perhaps years, to the life of a battery! Gould's nation-wide Field Engineering Service enables *you* to get the benefit of this added service . . . and lower your over-all battery power costs.

Your Gould Field Engineer's one job is to see that you get maximum service from your batteries. He is factory-trained to instruct your own men as to correct maintenance routines and to help set up a simple record system for anticipating battery needs.

There's a Gould Field Engineer in your area. He's as near to you as your telephone. Call him. And when you see him, ask him for the new Gould Plus-Performance Plan material for your battery maintenance staff.

Always Use Gould-National Automobile and Truck Batteries

GOULD
Batteries

GOULD-NATIONAL BATTERIES, INC.
TRENTON 7, N. J.

"BETTER BATTERIES THROUGH RESEARCH"

©1955 Gould-National Batteries, Inc.

Elastic Stop nuts were specified in 1949 to provide safety and low-cost fastening on the DL&W's famous Phoebe Snow.

Five years of high-speed passenger service confirms low maintenance cost of Elastic Stop® nuts

Holding fast despite vibration on shock absorber mountings . . . draft gear carriers . . . slack adjusters . . . brake cylinders . . . spring equalizer seats and pedestal tie bars, self-locking Elastic Stop nuts cut maintenance costs substantially on the DL&W modern Phoebe Snow passenger unit. Performing without failures for the past five years they eliminated the need for constant inspection and retightening. Easily removed without damage to bolt threads they can be re-used through many on-off cycles without loss of effectiveness.

Mail the coupon for detailed information on new, vibration-proof Elastic Stop nut fastening methods for locomotives, passenger and freight car applications.

ELASTIC STOP NUT CORPORATION OF AMERICA

ESNA® TRADE MARK / ROLLPIN TRADEMARK

Elastic Stop Nut Corporation of America
Dept. N68-923 2330 Vauxhall Road, Union, N. J.
Please send the following free fastening information:

☐ ELASTIC STOP nut bulletin

☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name _____ Title _____

Firm _____

Street _____

City _____ Zone ____ State _____

"Safety" GENEMOTORS and CONTROLS

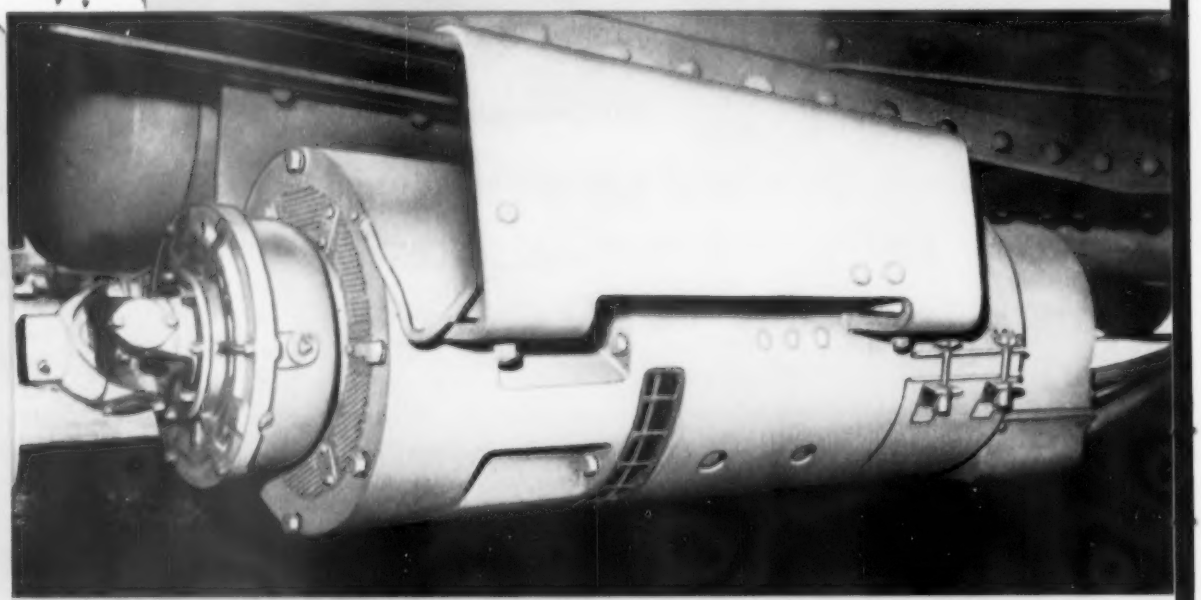
are standard equipment on railroads throughout the United States, Canada and Mexico . . .

"Safety" Genemotors and Control Equipment provide . . .

- constant voltage power for all air conditioning, electrical equipment and battery charging while cars are en route
- standby power in excess of requirements for pre-cooling cars and battery charging

"SAFETY" GENEMOTORS . . .

- incorporate an automatic polarity reversing switch thus eliminating maintenance of an additional generator, necessary when an exciter is used
- provide full output at low speeds assuring quick power availability for recharging low batteries



Typical installation of a "Safety" Genemotor . . . one of thousands in railroad service.

"SAFETY" CONTROL EQUIPMENT . . .

- maintains constant voltage regulation and positive current limit for maximum genemotor protection
- requires only three connections between regulator and genemotor
- is compact and automatic . . . requires minimum locker space
- is simple in design and requires little maintenance thus reducing labor costs to a minimum

Thousands of "Safety" Genemotors and Control Equipment applications on railroads throughout the United States, Canada and Mexico are actual proof of unparalleled performance in service.

"Safety" Genemotors are available in capacities of 25, 30 and 35 kw and in 40, 80 and 140 volts nominal ratings, with 20 or 32 HP AC, 60 cycle, 220 volt motors . . . 12 to 20 kw output on standby.

THE SAFETY CAR HEATING AND LIGHTING COMPANY INC.

NEW YORK · CHICAGO · PHILADELPHIA · ST. LOUIS · SAN FRANCISCO · NEW HAVEN · MONTREAL

SAFETY COMPANY PRODUCTS INCLUDE: Air-conditioning Equipment • Genemotors • Generators • Fans • Regulators • Blower Units Lighting Fixtures • Switchboards • Luggage Racks • Motor Alternators • Dynamotors • Motor Generators • Dual Voltage MG Sets

EDITORIALS . . . . . .

Life Span Should Control Maintenance

The diesel which came to the rescue of the railroads in a time of need, is in itself a major problem. It can do greater things than the steam locomotive, but to assure good performance, different things have to be done to it.

Various groups of men converge upon the diesel problem from different angles. The operator wants to get out the last ounce of performance that is built into it. Those in charge of running maintenance try to keep the locomotive at top performance, and endeavor to anticipate any possible cause of failure. The engineering and maintenance of way departments produce ever better track which will permit the diesel to do its best. The men in the heavy repair shop periodically put locomotives in as near new condition as is economically practicable,—wishing all the while that the operating department would derate the locomotives—just a little.

The manufacturers are building the best locomotives they know how to build, and their own design departments are constantly making improvements which upset the work of the production department. This making of changes is also highly distressful to the railway stores and maintenance departments, not to mention the drafting room. To add, apparently to the confusion, the railroads' mechanical and electrical engineers are constantly coming up with ideas for improving locomotive design, better shop practices and other ways of getting better performance and reducing costs.

The situation is one which calls for over-all planning. Each department concerned with diesel operation and maintenance plans its work to meet what is expected of that department. Over-all planning is necessary to coordinate the work of the several departments. Successful planning in turn could be helped immensely by some means whereby it would be possible accurately to predetermine the economic life of a diesel.

Knowing what the life was going to be, future needs could be provided for, over-maintenance could be avoided and the scrap value of old locomotives could be held within narrow limits. The economic advantages of such planning would seem obvious.

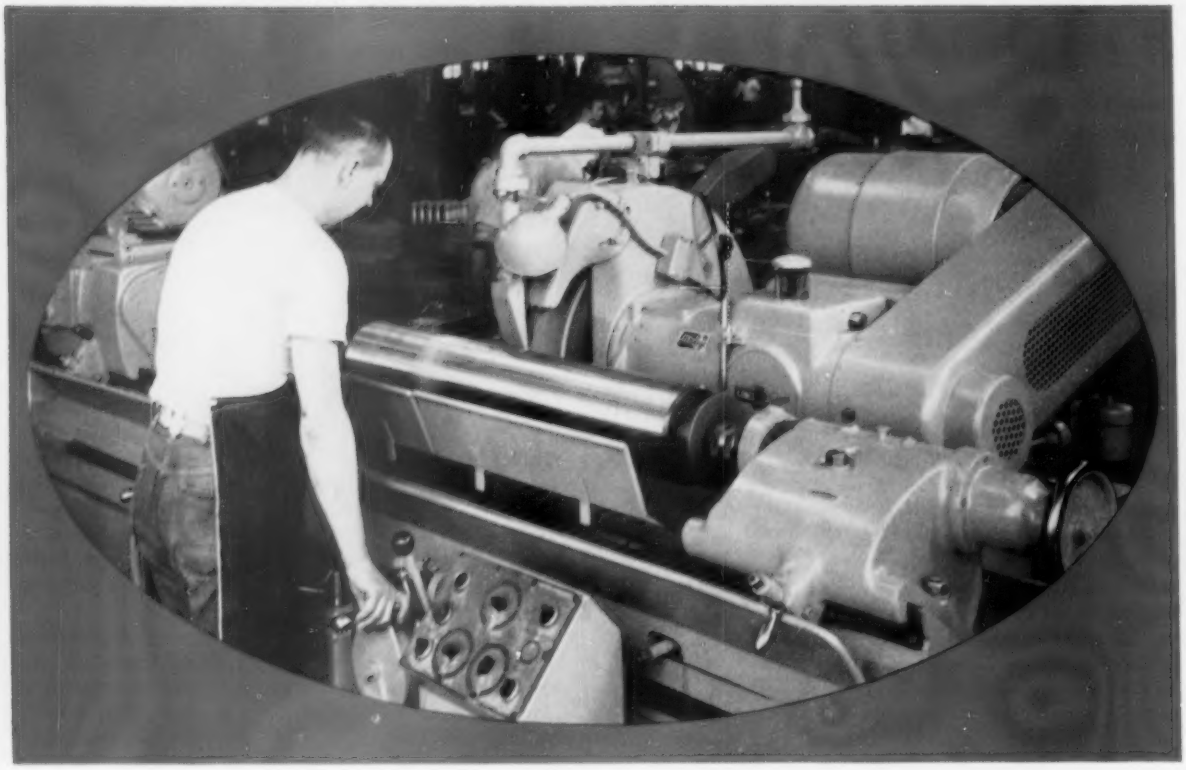
What the Alert Car Inspector Finds

"Excessive side bearing clearance, A; truck center plates binding, A and B; dust guards worn out, L-3 and L-4; brake hanger worn out, L-1; running board decayed, B end"—unfortunately reports such as this are turned in all too often and reflect conditions which conscientious car men uncover in the course of their daily work inspecting freight cars in train yards.

One more specific instance of a tank car which was also overdue for journal box repacking, showed the following imposing list of defects: "End running board brackets loose, A and B; tank bands loose, A and B; body bolster broken, A end; dust guards worn out, R & L, 1,2,3,4; box bolt nut missing, L-2; tank cradle block missing, A end; tank center anchor bolts loose and missing, R & L; slack draft gear, B end; loose hand brake ratchet wheel; truck snubber worn out, BL; truck spring out of place, BR; journal boxes worn out and working in truck frame, L-1 and L-2; oil box bolts loose, R 1,2,3,4."

This sounds more like the description of a car about ready to be retired and scrapped than one just received in a train yard from revenue service on a Class 1 railroad. As a matter of fact, the conditions described cannot be tolerated, especially in these days of high-speed operation. An adequate force of qualified car inspectors is required to ferret out all defects and supervisors must be backed up by their respective managements in holding cars, whether railroad or private owned, out of service until necessary repairs are made.

This does not mean excessive technicality and slavish adherence to the last letter of the law, as set down in the AAR interchange rules, for everyone knows that would tie up equipment and disrupt railroad service in short order. While so-called "judgment defects" introduce an element of uncertainty and should be minimized to the fullest extent practicable, *good* judgment is required in the interpretation and application of AAR rules and it is here that car inspectors and supervisors make their major contribution to railroad service. Undoubtedly their most important single duty is to see that freight cars and other interchange equipment having defects with a bearing on safety are held out of service and not released until the unsafe conditions have been corrected.



Cincinnati Filmatic 16″ Plain Grinder

Adds the final touch of quality to *HardClad** columns

CINCINNATI FILMATIC

CINCINNATI FILMATIC 16″
Plain Grinding Machine

Accuracy begets accuracy. It's especially true for radial drill columns, where high-quality finish and accurate, straight sizing are basic considerations to high-quality performance. While the CINCINNATI FILMATIC 16″ Plain Grinder in the illustration is not grinding a railroad part, it is the type of machine railroad shops should have for grinding large parts at low cost and to high standards of quality. These machines have many advantages for quickly grinding large work to the highest quality desired:

FILMATIC grinding wheel spindle bearings . . . outlast the machine; never require adjustment

Automatic wheel balancing . . . in seconds; while the machine is running

Automatic lubrication

Electronically controlled table traverse speeds

Many additional features of high-quality, low-cost performance. Write for more information.

CINCINNATI GRINDERS INCORPORATED CINCINNATI 9, OHIO

CINCINNATI

*Note: HardClad is the trade name for the Cincinnati Lathe and Tool Co.'s flame hardened radial drill column

CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

RAILWAY LOCOMOTIVES AND CARS

UP Opens Salt Lake City Diesel Shop

Present output of six heavy repair diesel engines and units a month will be stepped up to 20 at full production—about 4,000 units a month are inspected and serviced.

The new $6,000,000 locomotive servicing and repair shop of the Union Pacific at Salt Lake City, Utah, was officially opened August 2.

With a shop output of 4,000 units inspected and serviced monthly, this shop also overhauls six diesel units, including the engines, a month. With the shop in full production, employing a force of about 400 men and annual payroll of $1,800,000, it is anticipated that the output will be stepped up to 20 heavy repairs a month in addition to the units given normal daily attention.

The main shop building, 424 ft long by 162 ft wide, extends in a general north-south direction and houses four raised tracks with elevated platforms for heavy diesel unit repairs. It also includes the wheel shop, stores department, tool room, parts repair and cleaning rooms. A 324-ft by 80 ft wing just west of the main shop has three tracks with raised platforms and is devoted to running service repairs. A 264-ft by 102-ft wing extension on the east has a heavy repair bay, also two engine overhaul bays, an electric shop and the general office. The total floor area is 144,000 sq ft and the shop building covers 2.8 acres.

There are five different roof elevations in the plant ranging from 32 to 77 ft. The shop is served by five traveling bridge cranes, one Whiting 270-ton crane in the heavy-repair bay and four Northern cranes of 35, 20 and 10-ton capacities in various departments as indicated in the floor plan.

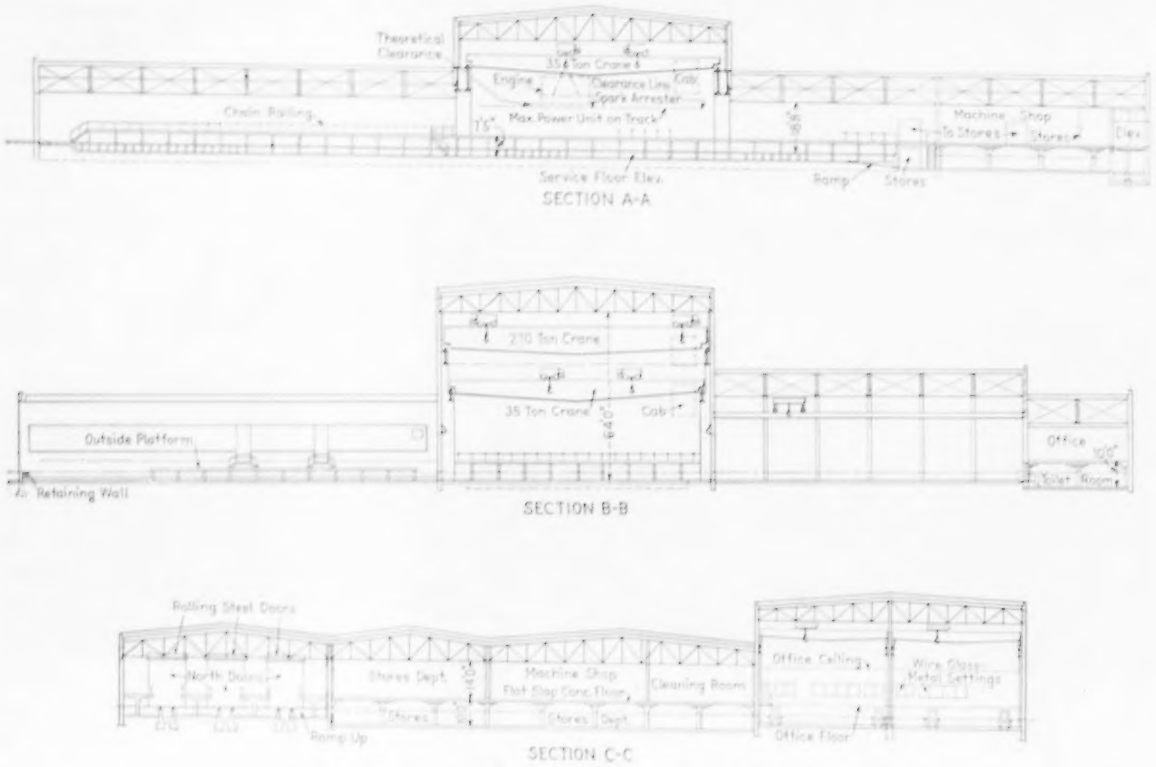
To permit installation of the 270-ton crane which can safely lift the largest UP diesel unit and the even heavier gas-turbine locomotive which is 83½ ft long and weighs 275½ tons, a section of the building had to be left unroofed until the crane was erected.

The Whiting 90-ton drop table for removing complete trucks from under diesel units presented a special problem in construction. The ground water level in the area is just 6 ft down and the drop pit had to be designed

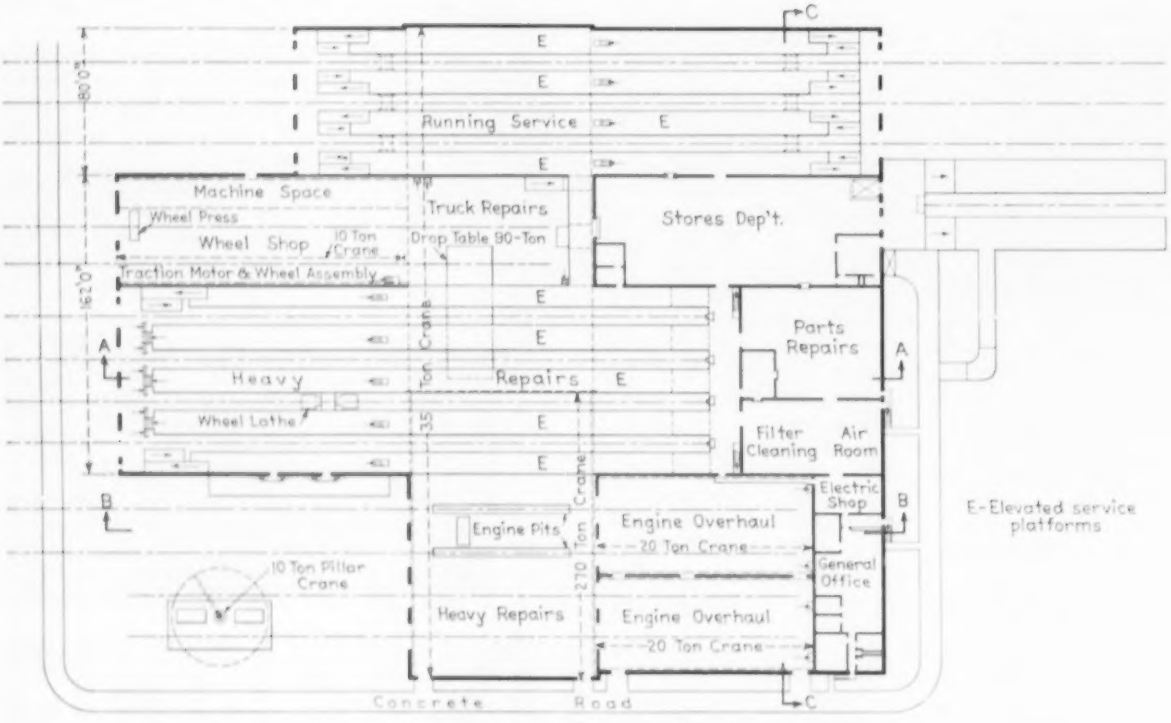
Principal Machine Equipment in UP Salt Lake City Shop

1	Standard wheel-truing machine
1	De Laval oil Puri-Filter unit
1*	Paxton-Mitchell Model-240 wheel-washing machine
1*	Yale 6,000-lb capacity electric fork-lift truck
1	Rogers 600-ton capacity wheel press
1	Westinghouse type 4-C air brake test rack
1	Magnaflux RTLL inspection unit
1	Magnaflux RC-1925 Magnaglo inspection unit
1	Cincinnati-Bickford 5-ft radial drill
2	Cincinnati-Bickford 4-ft radial drills
1	Chambersburg 75-ton capacity bushing press
1	Bullard Model-75 Cut-Master vertical turret lathe
2*	GE No. 17 engine load resisters
1	Betts heavy-duty hydraulic-feed car wheel borer
2*	Elwell-Parker 6,000-lb electric platform crane trucks
1*	Yale 8,000-lb capacity electric fork-lift truck
1	Farr air filter washer-oiler machine
13	GE battery chargers
2	Crane air-brake lapmaster machines
1	Niles 52-in. wheel lathe
1	Lucas horizontal drilling and milling machine
1	Monarch engine lathe
1	Niles side-head boring mill

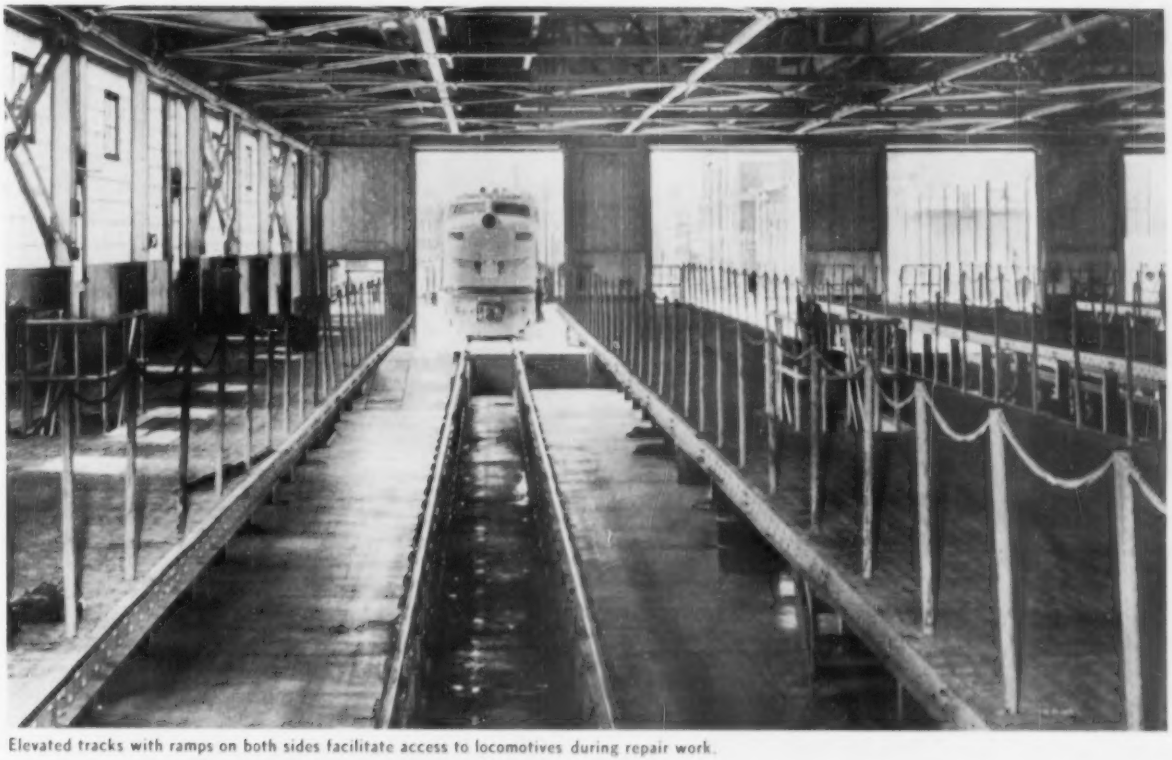
*Located adjacent to shop



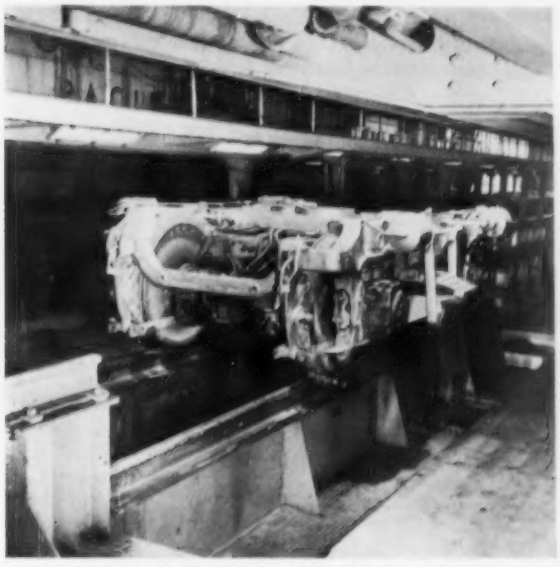
Sections through UP diesel repair shop at Salt Lake City, Utah.



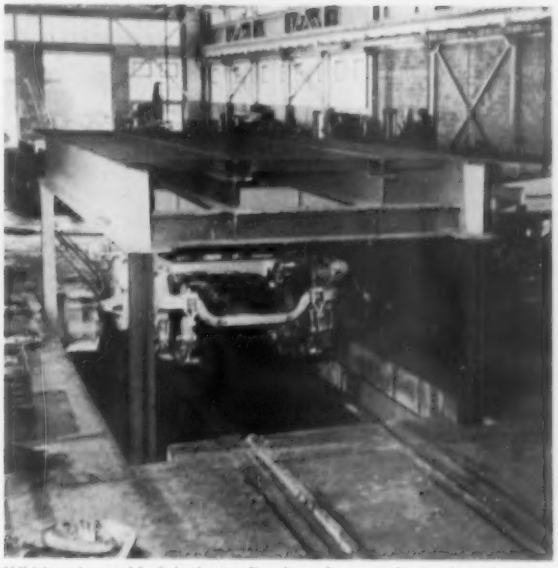
U.P. Diesel locomotive maintenance and repair shop.



Elevated tracks with ramps on both sides facilitate access to locomotives during repair work.



A set of trucks on the 90-ton drop table. When in use, a locomotive is parked with a set of trucks directly over the drop table.



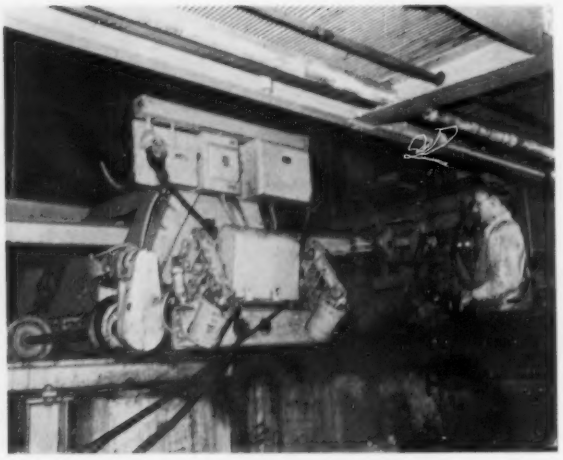
Whiting drop table bringing a diesel truck up to the level of the truck shop floor.

to take care of buoyancy as well as trucks. It was constructed heavy enough so that the weight overcame the buoyancy.

The Standard wheel-truing machine, installed in one track of the main shop building in October 1954 at a cost of $135,000 has already proved its value. In the first nine months of multiple-shaft operation, this machine was used to restore the standard tread and flange contour of 2,500 pairs of diesel wheels without removing them from their respective locomotive units. A single pair of wheels can be retrued, if necessary, and the locomotive unit returned to service in a total of 1½ hrs or less.

Cleaning various locomotive parts constitutes a major operation in any diesel shop and the UP Salt Lake shop is well equipped in this respect. One of the newer machines is a Farr automatic air filter washer with roller conveyors moving filters to the dryer and oiler at the rate of 60 an hour, or about as fast as one man can handle them into the machine and out of the oiler.

Standard wheel-truing machine being operated from a push-button control panel.

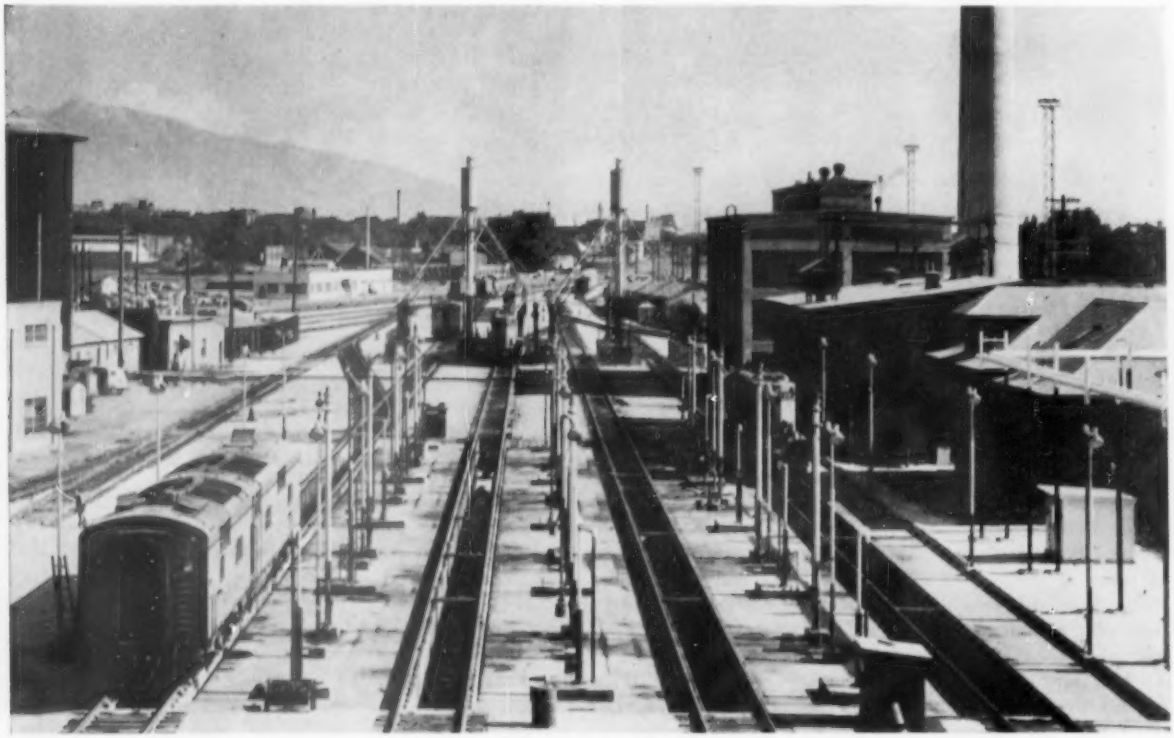


Machine used to spot locomotives on the wheel-truing machine. Electrically operated, it clamps itself to the rails and, with a rack and pinion arrangement, moves the locomotive to the desired spot.

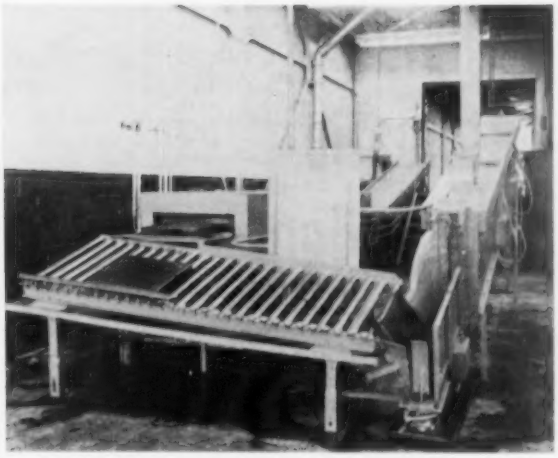
Heating System

The new shop heating system consists chiefly of unit heaters. In the shop areas, large industrial-type unit heaters, made by the American Blower Corporation, bring in 100 per cent fresh air. This air is brought to the final temperature of 110 to 115 deg F to furnish fresh air for the building. There are 43 of these units in the new structure, each bringing in 14,000 cfm of air and each having a heating capacity of 1,640,000 Btu. (In comparison, each heater would be large enough to heat 15 or 16 average-size homes.)

There are also 57 vertical discharge unit heaters, made by the Trane Company, which are used to supplement the heating in areas not requiring as much ventilation. They are also used around the large doors, heating the cold air which enters when the doors are left open. The office area of the new shop is heated by means of convector radiation. The convectors are Trane Company wall-type with sloping tops. All heating controls are of the Johnson Service Company pneumatic-type.



Servicing area of the new shop includes sanding towers and service pits for light servicing and fueling diesel and gas-turbine locomotives.



How air filters, coming out of the Farr washing machine, are upended to go through the dryer to the oiling unit.

Ventilation

Primary consideration was given to ventilation of the building because the diesel exhaust gases are highly toxic when concentrated. In order to assure quick exhaust of these gases, a series of hoods equipped with blowers are placed over each diesel unit service track. The roof ventilators attached to the hoods pull the gases up and out of the building immediately as they are expelled from the diesel units. The blowers may be operated singly or in banks. Other ventilators not connected to the hoods are placed about the roof to pick up gases which have escaped and risen to the underside of the ceiling. There are 109 power roof ventilators, each handling about 12,000 cfm and made by the Propellain Co., a division of Robbins & Meyers, Inc.

In connection with ventilation, it was found that the diesel engine exhaust gas and overhead heat made conditions so bad for operators of the 270-ton and 35-ton cranes in the heavy repair and running service bays as to necessitate operating 80 to 100 per cent of the forty 3-hp ventilating fans in this area continuously. The resultant noise level interfered with the radio and public address system, so the cabs of these two cranes were enclosed with plywood and glass, equipped with G.E. ¾-ton air-conditioning units and Motorola walkie-talkie equipment for taking cab signals from the crane director on the shop floor. The result is much reduced use of ventilating fans with attendant power saving, lower noise level in the shop and safer overall operation.

Other features

Special service lines go into each 11-ft platform from which the diesel units are serviced. There are 13 lines, including three water lines, two for oil, electricity and other items needed in the servicing of the unit. The outlets are located conveniently so mechanics may make quick attachment to the line needed. There is also access under each track to facilitate servicing.

All electric power is brought into the building underground and then handled for various needs through a sub-station in the building.

Outside the shop, special sanding equipment permits sanding a four-unit diesel on each of four separate tracks simultaneously. Another outside installation permits pit servicing of fuel, water and other items on four tracks. This is also used for inspection purposes.

A special water-treating plant supplies water for Vapor steam generators. No painting is done in the shop. The new building includes complete toilet-locker facilities for workers.

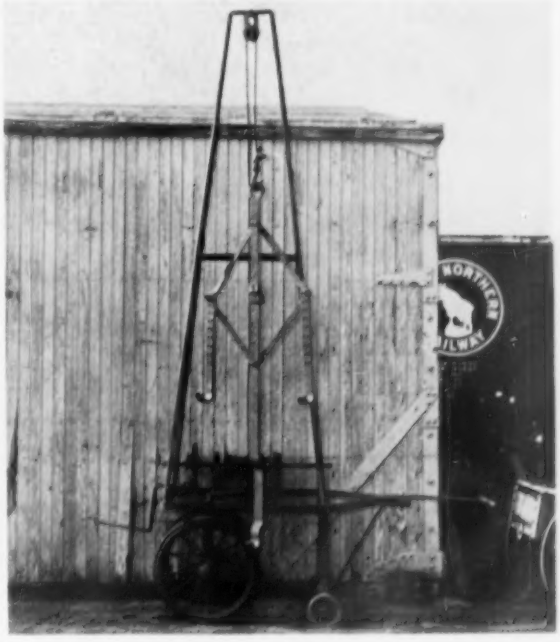
One feature of the shop designed to save steps and speed work is provision for storerooms on both levels of the shop. Items used primarily on the lower level are in the lower store and those used by mechanics on the upper level in the upper store.

Another machine-and man-hour saving device is the Motorola two-way communication equipment installed on three portable lift trucks, three chore boys, one service truck and one diesel locomotive crane. A radio transmitter located in the shop foreman's office enables a clerk to act as dispatcher for all of this important material-handling equipment and make sure it gets where needed in the shortest possible time.

Door Hanging Device

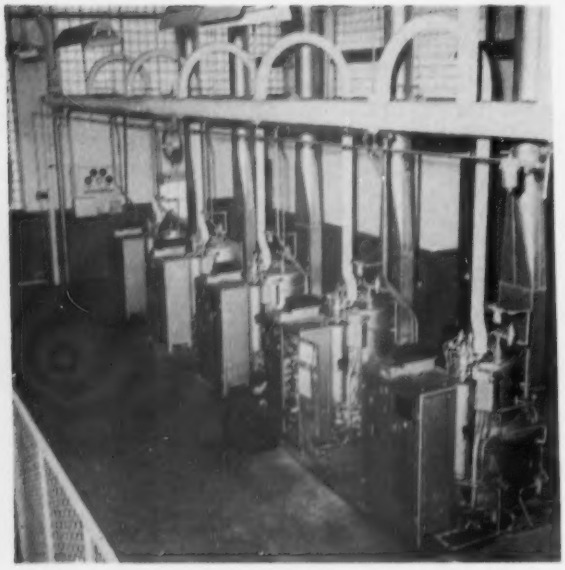
A railroad built door hanger, can be used also for loading bales of cotton and other miscellaneous stores and bulk merchandise. For hanging doors, a hook on the bottom grips the bottom of the door while the two hooks on the side go around the vertical edges of the door.

The device is made of strap iron $\frac{3}{8}$ in. by 2 in., angle iron 2 in. by 2 in by $\frac{5}{16}$ in., and 1-in. pipe. The hanger portion is $\frac{3}{8}$-in. by $2\frac{1}{2}$-in. strap iron.



Hanger built for box-car doors can be used also for handling miscellaneous stores and bulk goods.

Completely Automatic Steam Plant



These five steam generators supply steam for cleaning, to make compressed air, and to . . .

Heat over 3 million cu ft of shop space indoors. Their output also . . .

Keeps 15 to 20 cars warm on the ready track in the cold winters of Sault Ste. Marie where 30 below is not uncommon.

A completely automatic steam plant has been put in service by the Algona Central at its Sault Ste. Marie, Ont., Canada, location of the main shops and offices. Five automatic Vapor-Clarkson, oil-fired, package-type steam generators were installed in a corner of the diesel locomotive shops to replace the older coal-fired boilers. This bank of automatic steam generators produces from 800 to 15,000 lb of steam an hour to meet the widely changing steam load of the shops. In the summer 800 lb of steam an hr at 80 psi pressure is used for steam cleaning locomotive parts and filters in the shops. In the winter up to the 15,000-lb capacity is needed to heat the 3,313,000 cu ft of space in all the shops and office buildings and railroad passenger cars on the outside ready track.

A master control turns one, two, three, four or all five of the steam generators *on* or *off* as needed to meet the changing steam load of the shops. On a cold winter morning, when it is 20 or 30 below zero, four or five steam generators may be used to heat the shops. When the sun comes out and the temperature rises, one or two of the steam generators may be turned off by the master-control, then on again when the temperature drops—both operations being automatic as explained in box.

How Conversion Was Made

After the old boilers, along with the coal and ash handling equipment were removed, the boiler room section of the diesel shop building was re-built, using large sections of glass block brick. A 4,000 Imperial gallon (4,800 U.S. gal) oil-fuel tank was bricked in at floor level with oil pipes from the larger tanks in the yards. A 3,000 Imperial gallon feed water tank was fabricated in the shop and placed at floor level next to the fuel tank.

All water, fuel-oil and blow-down piping to the five steam generators installed in front of the fuel and water tanks was placed in a drain trough trench behind the units. A metal grating covers the trench.

Steam from each unit goes into an 8-in. steam header (about 8 ft above the generators) from which the steam pipes for the different shop buildings are taken off. Steam is carried from the generators to the header through a 2-in. pipe with an expansion arch.

It was not necessary to build an expensive brick chimney. Instead, a steel exhaust stack rises from each steam generator and extends about 5 ft above the roof. The exhaust stacks do not have to rise high in the air to create a draft the steam generators have forced draft blowers.

A vacuum pump on the heating system returns all steam condensate in the system to the feed water tank, except the steam used to heat the 12 to 18 passenger cars outside and the steam used for hot jet cleaning. All feed water is zeolite treated.

How Steam Output Is Automatically Controlled

A master steam generator control automatically turns on or off the one to five steam generators as needed to keep 100-lb working steam pressure on the steam header. To put the automatic steam plant into operation only one steam generator is turned on manually before this master control on the wall in the background takes over and turns on as many of the remaining four as needed. Each steam generator then automatically varies its output by metering the fuel, air and water to make from 1,000 to 3,000 lb of steam per unit per hour, or total capacity from one to 15 thousand pounds an hour.

Here's how the control works. Assume it is 20 below outside and four steam generators are needed to heat the shops. During mid-day the temperature rises to five below so only three steam generators are needed. As the steam load gets smaller the fourth steam generator is shut down in the following sequence:

1. The fuel to the steam generator is shut off.
2. The steam generator motor continues to operate for five minutes to refill the coils with water.
3. The motor shuts off, leaving the coils filled with water ready to light up when the unit is again called on to make steam.

When the fourth unit is turned on, first the motor drives the water pump for 40 seconds to be sure water is in the coils. Then the fuel is turned on, a continuous spark insuring proper lighting of the fire. In case the fire does not lite up in a few seconds the unit is turned off to avoid flooding the unit with unburned fuel.

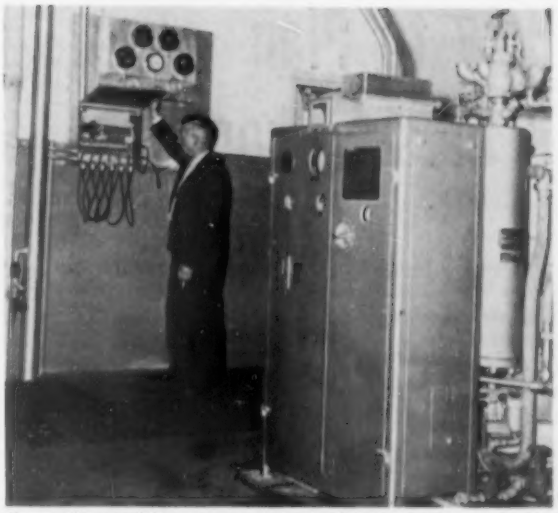
An alarm circuit rings a bell in case a unit does not light up properly. In this case, the unit is passed up and another unit turned on. Then an attendant can check the passed-up unit before starting it manually and putting it back on the line.

Control over cutting generators in and out is by the steam pressure in the header. Normally this is 80 psi. When the demand goes up, the first reaction is that this pressure drops. The drop causes the low-pressure switch to begin the sequence of operations to put another generator on the line.

First, a master-timing motor shaft closes a switch feeding current to a unit-timer on the next generator to be put on the line. As the unit-timer motor turns, a cam closes a switch which turns on the motor driving the steam generator's water pump, blower and fuel pump. After the motor runs for 40 sec to pump water into the coils and purge air through the combustion space, the unit-timer actuates a second switch releasing atomized fuel-oil under pressure into the combustion space, which is lighted off by a continuous spark. Within 80 sec this unit develops 80-lb working steam pressure and produces up to 3,000 lb of additional steam per hour to handle the increased load, and the master timer then stops.

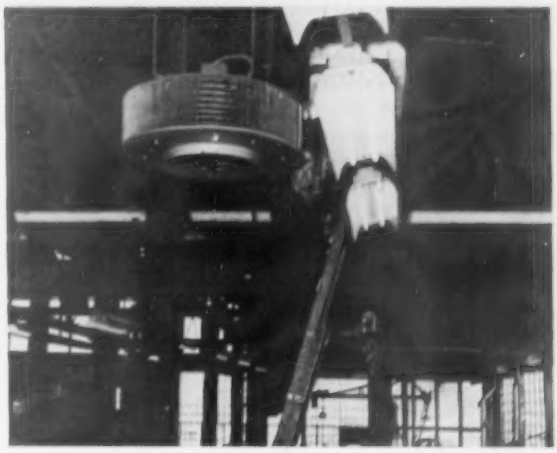
When the demand drops off, the pressure in the header naturally rises as more steam is being made than consumed. This causes the hi-pressure switch on the master control to start the master timing motor. Within two minutes the cam actuates a switch on the shaft feeding current to the unit-timer motor on the No. 4 steam generator. This shuts the solenoid fuel valve cutting off the fuel supply, but allows the steam-generator motor to continue to run two more minutes to refill the coils with water.

Blow down is also actuated automatically a few seconds every 15 min to remove the sludge in the steam separator.



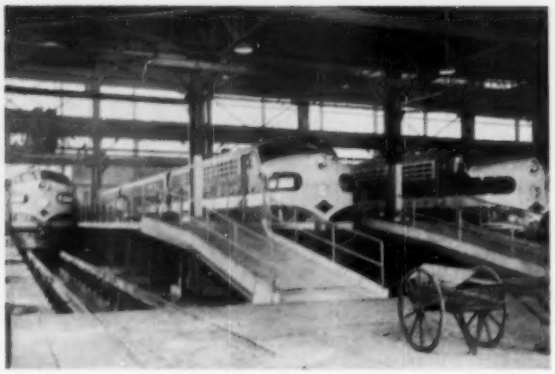
One small control box starts or stops the five generators as necessary to meet changing steam demand

Steam is supplied at approximately 80 psi for cleaning and heating shop; at 50 lb for heating office and passenger cars on ready track



The space heaters are thermostatically controlled with a 2½-hp blower circulating air through the steam heated coils. Average height of the shop is 30 ft.

How to Plan A Diesel Shop



When the diesel electric locomotive came on the railroads in substantial numbers, the builders advocated separate facilities for maintaining them to avoid intermixing two types of power. This in the interest of cleanliness, and to provide a shop with features peculiar to diesel maintenance such as small overhead cranes, elevated platforms, depressed floors and the fuel, lubricating oil and water piping.

Some have not constructed any new shop buildings. Since most roads followed the builder's recommendation from the very start, in later years, as the number of diesels increased, the facilities first constructed were far from adequate. This necessitated expansion and alterations to keep pace with power acquisitions.

Later, it developed that some of these facilities were not constructed in the most desirable locations. At the same time the use of steam locomotives was diminishing and steam facilities gradually became vacant. Usually, these shops were well constructed and in good physical condition. In many cases they have been fully depreciated, so the taxation is lower than it would be for newly constructed shops.

This raised the question as to what should be done with the steam facilities. Consequently, railroad management changed its thinking and directed that thorough studies be made to determine how they could realize the fullest possible use of existing shop facilities, without spending large sums for new facilities.

It is this background and present day viewpoint that makes this subject of paramount interest to us, particularly in view of the fact that some roads are fully dieselized and those which are not, are rapidly approaching complete dieselization.

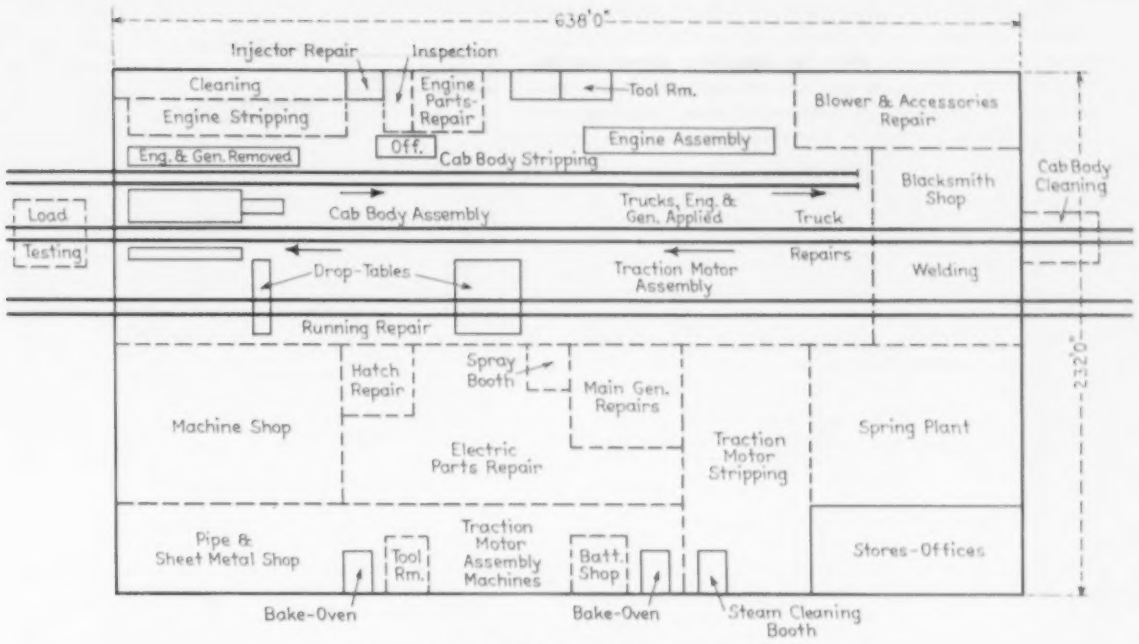
The use of diesel power allows extensive concentration

Advantages and Benefits Realized in Converting Existing Facilities

- **Eliminates need of constructing new buildings at present day costs.**
- **Existing buildings are depreciated; therefore, taxation is less.**
- **Heavy cranes for heavy work are adequate and purchase of new cranes is seldom necessary.**
- **Power plants are more than adequate for supplying heat, air and steam. Generally their capacity can be reduced.**
- **Existing electric power supply is ample, and changes are made at a low cost.**
- **Locker and wash room facilities are available.**
- **Administration and supervision offices are usually more than adequate.**
- **Fire lines and fire-fighting equipment is already on the property and approved by the underwriters.**
- **Public utility services have been installed.**
- **Employes are established in the community and its civic life.**

TABLE I—CONVERSION OF EXISTING STEAM LOCOMOTIVE SHOPS AND FACILITIES FOR DIESEL LOCOMOTIVE MAINTENANCE

TYPE OF SHOP	WORK TO BE HANDLED	PROVIDE SHOP SPACE FOR
General shops and supporting plant buildings, including transfer table, turntable, power plants and store buildings	Heavy classified repairs Light classified repairs Unclassified repairs Heavy accident repairs Annual inspections	Diesel engine overhaul Diesel engine sub-assemblies and appurtenances Heavy electrical rotating equipment Light electrical rotating equipment Electrical control equipment Locomotive carbody and accessories Truck and brake rigging repairs Air-brake equipment Wheel and axle, including journal roller bearings and boxes Various cleaning vats and tanks Locomotive painting Steam generators, if used Material dispensing adjacent to work
Division roundhouses, turntables and store buildings	Running repairs Periodical and ICC inspections Terminal servicing Change traction motors and wheels if not done at a general shop	Pits for underneath inspections Servicing Light locomotive repairs Removal and application of traction motor and axle assemblies
Small roundhouses, locomotive shelters, and other tie-up facilities	Turn-around and necessary ICC inspections Locomotive servicing, if length of run requires	To protect locomotives against weather, where climate necessitates Storage of minimum engine supplies and tools if needed



Layout for combined heavy and running repair shop.

of maintenance at a selected shop or terminal, thus permitting the closing up or retiring of many of the steam facilities at intermediate terminals. So, it is quite natural that a thorough study of the various locations must be made to determine which are the most advantageous to retain from operating and maintenance standpoints.

In selecting a location where facilities exist, consideration must be given to property values and taxes because in certain areas where values and tax rates are high, the entire facility, including the land, can be leased or sold for a price sufficient to justify construction of a modern shop on a location where values and taxes are less.

If existing facilities are in the location desired for diesel locomotive maintenance and the buildings are in good condition, they usually can be converted, with certain modifications, to handle all kinds of diesel work at a nominal cost.

Unneeded portions of buildings or ground area can be released for other railroad purposes, leased, sold or disposed of to the best advantage. This can result in reduction of taxes, provide additional income and locate another customer on the railroad property, and at the same time secure good returns from the investment.

It is difficult for this committee to make general rules for shop design because of the many variables in demands and limiting conditions. Heavy repair shops can, but need not be isolated.

Where only a few diesel locomotives are operated, the most efficient plan may be to combine the major overhaul with the running repair point at the same location. The heavy repair shop then becomes a major extension of a running maintenance shop. This combination provides the heavy overhead cranes for handling the units, but it saves space, supervision, labor, shop expense, dispatching, material handling and inventories. Machinery and equipment will serve for both operations and work can be coordinated. Employees may be used interchangeably on classified, unclassified and running repairs.

Types of facilities differ widely on the various railroads and in order to formulate wise decisions and to evaluate the diversified problems, individual studies have to be made of present versus that of erecting new facilities for diesel maintenance. In doing this, consideration must be given (1) to whether the buildings are best situated geographically; (2) whether the structures are of size and value to justify the conversion expenditures; (3) what are the supervisory and manpower problems, and is ample skilled labor available; (4) where is the source of material supply and what is the delivery time, because this affects material inventories.

In rearranging existing shops for diesel maintenance, a decision must be made as to what machinery, cranes, pits and tracks will be retained and what will be retired. Where shop machinery that requires heavy and expensive foundations is retained it should be left, if possible, on its present foundations arranging other work around such machinery to eliminate the expense of new foundations. This principle applies to existing pits, craneways and other structural features of the building that would involve considerable money to change or relocate.

Where diesel units are run inside the shops, provision must be made for adequate ventilation. Often this feature has been overlooked and later had to be installed at a much higher cost.

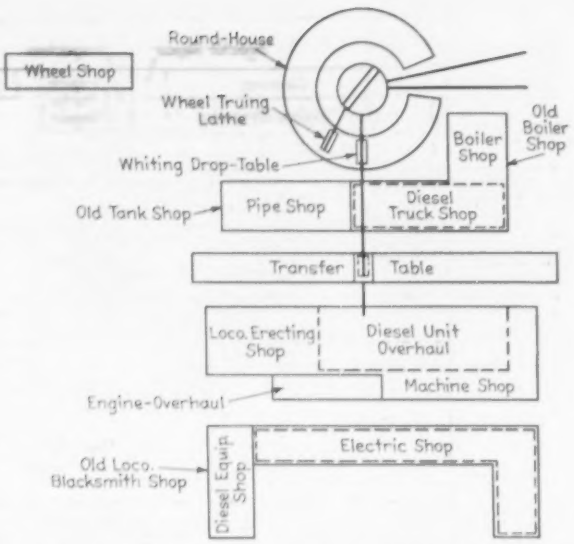
Generally, the larger steam facilities such as general shops are comprised of two main buildings with a transfer table between, and two or three supporting buildings located nearby. The main building in this group, which is the erecting and machine shop is ideal for heavy classified and accident repairs. The customary heavy machinery in this building used in steam locomotive maintenance is not required for diesel work and most of it can be retired. A large floor area was needed for this heavy machinery and its retirement releases sufficient space for rebuilding of the diesel engine, repairs to the diesel engine component parts and the electrical control equipment.

The building across the transfer table formerly used for boiler, tender, truck, blacksmith and heavy forging work may be a suitable shop for handling diesel trucks, main generators, traction motors, steam generators and storage battery repairs. A portion of this building can be made into a paint shop and another used for heavy underframe and car body structural repairs.

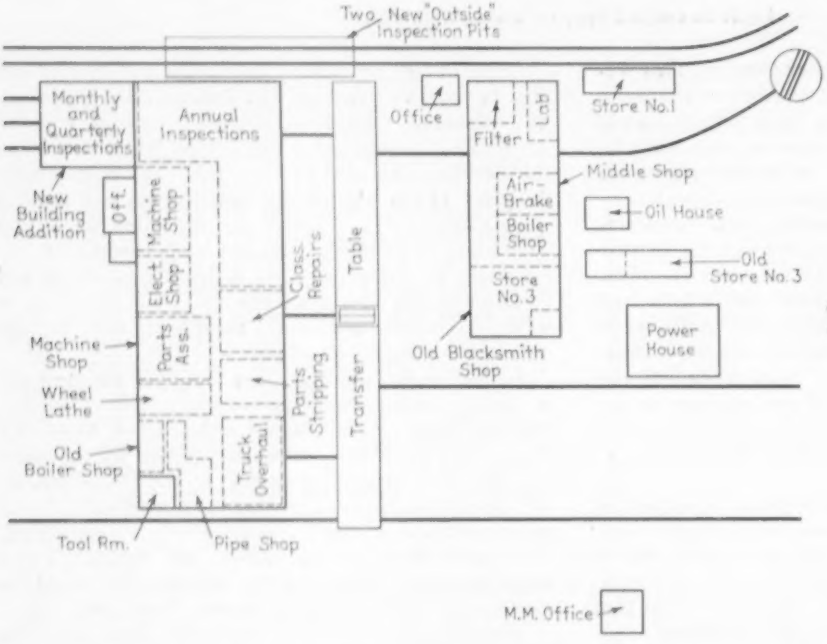
Air brake, wheel and axle, sheet metal and pipe work for steam locomotives was usually done in separate buildings adjacent to the two principal buildings. Corresponding work for diesel maintenance can be done in the same buildings or consolidated into the main building when there is ample floor space.

New machinery needed for diesel work if nominal and little floor space is needed, except when undertaking complete overhaul and rebuilding of main generator and traction motors. The machinery and equipment required to do this work involves a substantial investment and considerable shop space, and there should be ample room for maximum needs.

Consolidation and concentration of the repair and maintenance operations always provides the greatest use of property, machinery, tools, supervision and labor. This is not the case when work is spread out into various buildings which sometimes are far removed from the center of activities. Proper grouping for the various operations and maintenance work with good scheduling of work flow through the shop increases its productivity and affords better supervision with a minimum number of supervisors.



A shop layout where part of an old steam enginehouse is used in the heavy repair set-up.



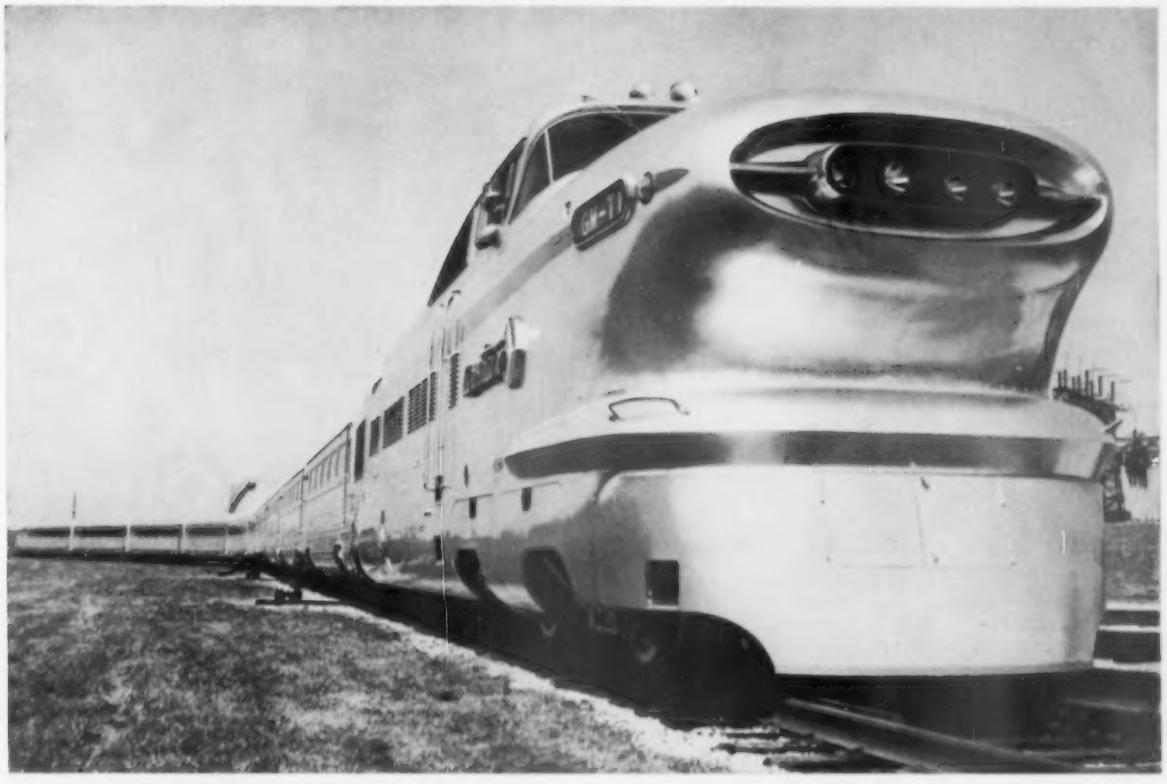
Outline diagram of combined heavy and running repair shop.

Railroads having few diesel locomotives have been able to consolidate their diesel work to the extent that it was entirely practical and economical to retire most of the roundhouses and retire others in part. Where a part of the roundhouse has been retained that portion has been adapted to diesel work by installing ramps, platforms, lighting, cupboards and necessary fuel, lubricating oil and water facilities.

Other railroads have utilized the existing roundhouses by filling in alternate pits, extending other pits sufficiently in length to accomodate two unit diesel locomotives, raised sections of the roof and made modifications to the buildings where necessary to increase the length of two or three tracks. Small turntables have been modified by adding knee brackets to each end of the turntable and modifying the turntable pit to suit, which has been done at nominal cost.

The size of the railroad, number and types of diesel locomotives operated, length of runs and type of service have direct relation upon what should be done with the existing steam facilities. The smaller railroads, usually

(Continued on page 61)



Radically different appearance seems to be the trend in the new concepts in lightweight train designs. Shown here pulling GM's new 10-car "Aerotrain" is the standard diesel unit which EMD will offer for all lightweight trains. This design of locomotive will also power the new "Jet Rocket", the Talgo-like speedster soon to be delivered to the Rock Island by ACF.

"Lightweight Train Day" at Chicago

Rock Island tests ACF Talgo at over 100 mph while GM reveals added details on new Aerotrain

A few weeks ago the same day saw the official christening of General Motor's new lightweight "Aerotrain" and high-speed test runs of ACF's prototype Talgo-like "Jet Rocket" to be delivered to the Rock Island in December to improve its Chicago-Poeria schedule. In addition to cutting in half the weight per seat compared to present equipment, the new trains have one other feature in common; both will be powered by the same design of locomotive which will be the standard unit which EMD will offer for all lightweight trains.

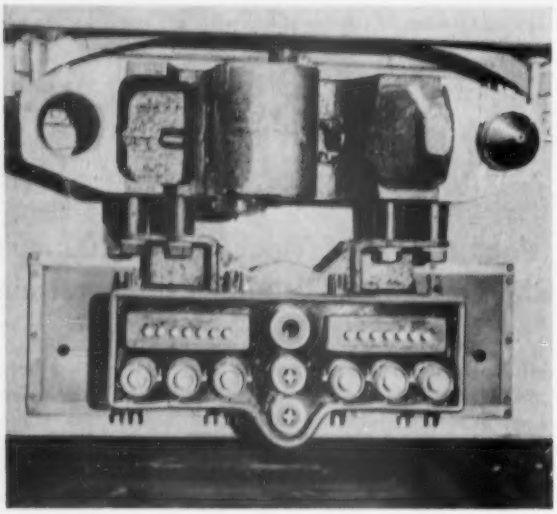
The single unit locomotive is 53 ft long and 13 ft 7 in. above the rail. It will be powered by one EMD engine with 1,200 hp for traction. The front four-wheel truck will be the driving truck with two traction motors. An idler axle with two wheels will sustain weight at the rear of the locomotive. Two Detroit diesel engines in the locomotive will operate generators to supply current for heating, lighting and air conditioning. The locomotive will have dynamic brakes, geared for top speed of 102 mph.

The Talgo train tested is a descendant of the well-known Talgo trains of Spain, which have accumulated some $\frac{3}{4}$ million miles of revenue service since 1946. It has been modified to fit U. S. railroad conditions. Floor height has been increased from 18 to 26 in. above the rails, width reduced from 10 ft 7½ in. to 10 ft 2 in., height raised from 9 ft 7 in. to 10 ft 10 in. and the length increased from 20 ft 2 in. to 34 ft 6½ in. per body unit. It is still, however, about 3 in. wider than a conventional car, $1\frac{2}{3}$ ft lower and the floor 2 ft closer to the rails. Center of gravity is about 1½ ft lower than the 55-58 in. of conventional cars.

Weight per seat has been approximately doubled over the original Talgo, but the 800,000-lb buffing load and other AAR and RMS standards are met. Radially guided axles have replaced the old wishbone arrangement, permitting the cars to run in either direction, unlike the original Talgo which was restricted to one way operation.

During the 144-mile round-trip test run, the Talgo reached a maximum speed of 103 mph on straight track. Perhaps more significant, however, was the comfort with which the train took, at 85 mph, a curve on which present streamlined equipment is restricted to 70 mph.

The bins in the underframe serve as extra roomy baggage compartments for easy loading from station platforms. One bin contains the heating and air conditioning equipment.



The "Aerotrain" uses a new automatic coupling device, which in one operation joins air lines, power lines and control lines. Supplemental diesel engines in the locomotive will operate generators which will supply current for train heating, lighting and air conditioning. Talgo also has head-end power and automatic coupling.

Riding qualities of the new Talgo were comparable with the best of present equipment at high speed, although noise was slightly higher where the body units join. At very low speeds, up to 15 or 20 mph, rail joints were more apparent than with four-wheel truck equipment. The unit tested was, however, only a prototype of the new train to go into service on the Rock Island, and was built for test purposes to get out the "bugs" that are always found in any new design.

GM Train Rides on Air

The most apparent difference between the GM train and the Talgo is that each GM car has a two-wheel truck on each end. The car body rests on these trucks through bellows-type air suspension rather than springs. The air suspension serves three purposes—to cushion impacts, to insulate against noise by breaking the through metal contact, and to keep the car both level and at a constant height. The latter purpose is served by admitting or releasing air from each of the four sets of bellows.

As passengers enter the car, causing the body to settle down, air is admitted automatically to each of the four bellows. In going around a curve at high speed, causing the body to lean outward, air would be admitted to the outside bellows the same as if the reduction in distance between the body and the rail resulted from increased load. At the same time, air will be released from the bellows on the side of the car toward the inside of the curve as this side tends to rise. The combined effect of the two actions is to keep the car floor parallel to curve elevation.

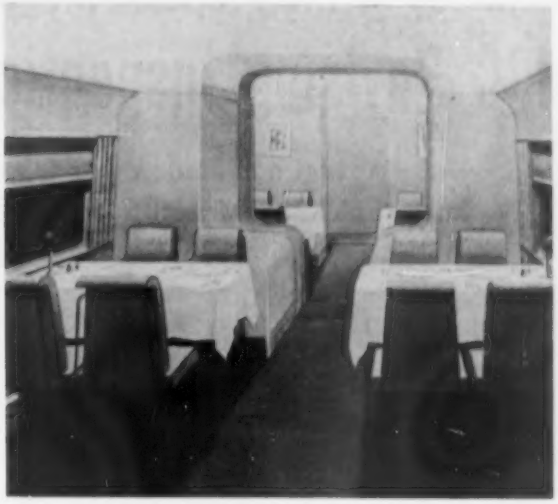
The body will be the 40-passenger GMC bus body widened 18 in. to give more comfortable seating space and a wider aisle. It is 40 ft long, 10¾ ft high and 9½ ft wide. The driver and engine compartment is replaced by a vestibule. One car end will contain a lavatory and pantry for serving meals. The other end will be a vestibule with entrances on both sides. The doors and steps are so arranged that the entrances will serve either high or low station platforms.

The body will be mounted on a bin-type underframe. One of the bins contains the heating and air-conditioning equipment. The others can serve as baggage and luggage carrying spaces. This construction concentrates the weight on the lower part of the car, giving a low center of gravity (45 in. above the rail) yet lets the passengers ride high.

The three articulated bodies joined together in the Talgo car, with the high and wide archways between, give added appearance of spaciousness. Overhead fluorescent lighting is supplemented with airplane-type reading lights over each seat.

The need for curtains is eliminated by the use of tinted glass in windows of the GM cars. Seats have metal backs and plastic headrests to cut cleaning time. Sliding doors are power-operated. Each 40-ft unit in the GM train has its own entrance.

Here is GM's idea of loading from either ground level or high level platforms. For ground level, entry steps are similar to standard construction, with drop apron. Exit from elevated platforms is facilitated by roof hatch, which swings upward to provide headroom.



The Aerotrain has a pantry in each coach for serving meals airplane style. The Jet Rocket has dining accommodations like present trains for 32. The Jet also seats 276 in the coach, 20 in the parlor car, and 12 in the beverage section.

Two of the GM 40-passenger cars are equivalent to one 80-passenger conventional coach but weigh 30 tons instead of 65, yet meet the same 800,000-lb buffing load requirements. When tooled for volume production, GM expects the new cars can be sold for $900 to $1,000 per seat, compared with $2,250 average cost per seat for present coaches.

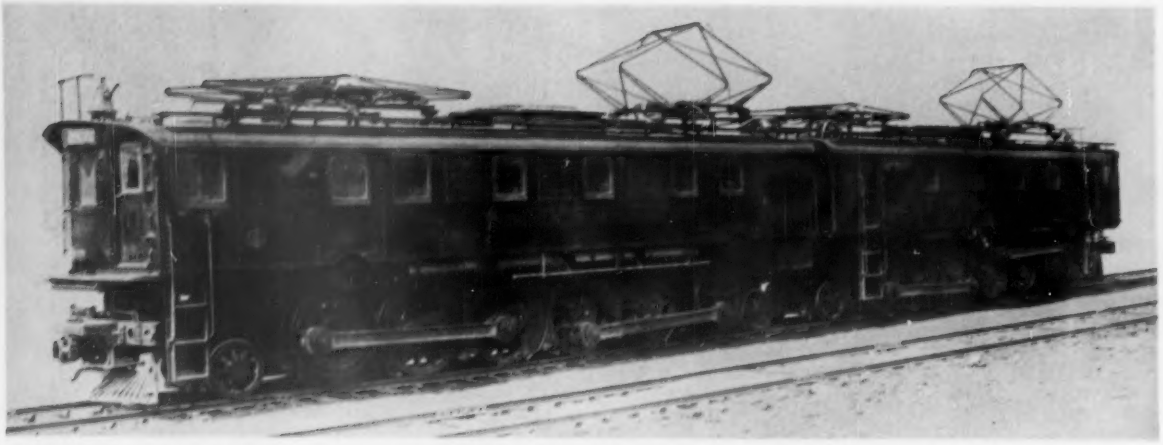
How the Trains Are Heated

The heating systems of the two trains have certain features in common and a number that differ. Both depend on electric heating in mild weather with current furnished by the locomotive, and both have a hot water heater for cold weather.

The Talgo cars have an electric overhead heating system and a liquid heating system for floor heat. The nonfreezing liquid medium is heated by a Vapor 4909 hot water heater that puts out 90,000 Btu per hour. One heater is installed in each three car unit of the train. It burns diesel oil and is turned on and off automatically to supplement the electric heat to keep the car comfortable.

The Aerotrain is heated by a liquid circulated through the radiation. The liquid is heated by electric immersion heaters on mild days with current from the locomotive. If the 12,500 Btu capacity of the electrical heat is not sufficient to kep the liquid medium at 160 deg, a Vapor 4915 hot water heater automatically lights up and heats the liquid as needed to keep the car warm. This heater

(Continued on page 61)



In 1924, "other-than-steam" meant this type of electric locomotive with steam type frame, large drivers and pilot trucks. As shown, multiple unit operation is not a new concept.

Already at the Proposal Stage . . .

ICC Revising Inspection Rules

Dieselization has made other-than-steam locomotive inspection rules the most important. When written, electric locomotives predominated but now electric locomotives constitute but a minor percentage of other-than-steam ownership.

Steam locomotives in service at mid-year were outnumbered three to one by diesel electric and electric locomotive units. At the same time, electric units in service were outnumbered forty to one by their "other-than-steam"partners. Yet today, the Locomotive Inspection Rules for Other Than Steam Locomotives, while covering electric locomotives, are inadequate in scope for Diesel power. Present rules were prescribed by an order of the Interstate Commerce Commission on December 14, 1925. Since that time there have been some revisions.

Up to the present, locomotives have undergone much more sweeping changes than have the inspection rules. Almost all diesel-electrics and most recently-built electrics have been mounted on four or six wheel swivel trucks. When these rules were originally prescribed, electric locomotives had steam-type frames and large driving wheels with separate tires. About a fifth of the revisions treat items that have arisen from the use of motored trucks and solid steel wheels. Dealt with are the maintenance of bolsters, center plates, solid wheels, brake rigging, slack adjusters, and box-to-pedestal clearance when there are no wedges. Cleanliness around trucks and wheels, and safety hangers for truck components and brake rigging are specified.

Changes in regulations relating to running gear are only part of a thorough overhaul of the inspection requirements. For six months during his interim appointment as Director of Locomotive Inspection, John A. Hall guided the preparation of 58 new and revised rules and instructions. These were first published on April 20, 1955, and are now scheduled for public hearings early in November. Only after this can the Commission take action to put them into effect.

Steam Generators Recognized

The modern steam generator has caused the largest number of changes relating to a single subject. Nearly one-third of all the revisions deal with this equipment. Components, controls and safety devices for the forced circulation boiler are listed for maintenance and test. Brake portions introduced with the newer air brake schedules are also listed for periodic testing.

Internal combustion engines and related equipment have brought problems which are covered in the only complete new rule which is proposed. Rule 262 would cover the "safe and suitable for service" maintenance of the diesel engine. It also would require that the engine be kept clean, and that its temperature and pressure alarms be properly maintained. Fuel tanks must also be clean, and they must be fitted with accessible cut-off devices. Exhaust from the engine must be discharged so

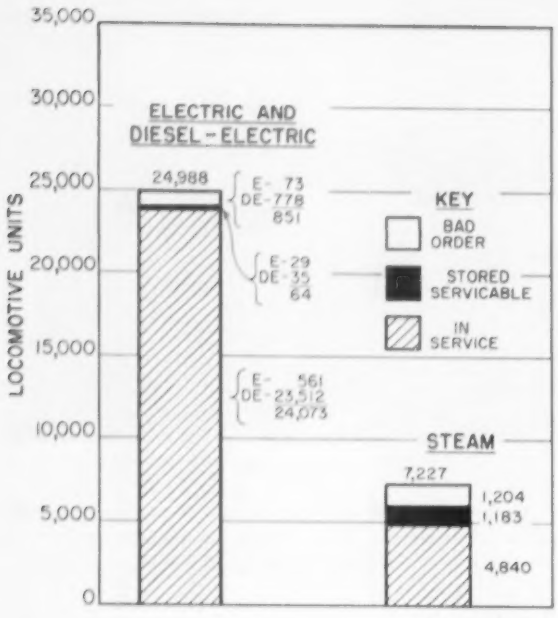
In 1955, "other-than-steam" means this type of diesel-electric locomotive. Trucks are used almost universally under diesel-electrics; most recently built electrics have them too.

that it does not enter the operating cab. The requirements about fuel tanks and exhaust are also applied to steam generators in separate rules.

Carbody and cab are the subjects of considerable revision. Shatter-proof glass would be mandatory in cab windows by 1957. Required by 1958 would be emergency

Here Are the Proposed Changes . . .

ICC RULE NUMBER	TYPE OF CHANGE		WHAT IS CHANGED?	WHERE COULD CHANGES APPLY?									
	New Requirement	Present Rule Rewritten		Units In Multiple-Unit	Controls-Air and Electric	Cab and Cab Equipment	Engine, Auxiliaries and Compartment	H. Volt. Electrical System	Fuel Tank and Fuel System	Carbody and Underframe	Brakes and Brake Equipment	Trucks and Wheels	Couplers and Draft Gears	Steam Generator and Controls
201 c	x	–	All control from one cab in mu	x	x	x	–	–	–	–	–	–	–	–
201 d	x	–	All wheel slips show in cab	–	x	x	–	–	–	–	–	–	–	–
204 b	x	x	Emergency brake valve	–	–	–	–	–	–	–	x	–	–	–
205 a	x	x	Control air reservoir	–	x	x	–	–	–	x	x	–	–	–
205 b	x	x	Add "load and unload"	–	–	–	–	–	–	–	x	–	–	–
205 f	x	–	Exclude oil from air system	–	–	–	–	–	–	–	x	–	–	–
208 a	x	x	Maintenance of brake equipment	–	x	–	–	–	–	–	x	–	–	–
209 b	x	x	Brake travel and slack adj.	–	–	–	–	–	–	–	x	x	–	–
210	x	x	Brake equipment safety hangers	–	–	–	–	–	–	–	–	x	–	–
211 d	x	–	Control air leakage	–	x	–	–	–	–	–	x	–	–	–
212 a	–	x	Eliminates "between units"	x	–	–	–	–	–	–	–	–	–	–
212 f	–	x	Uses "automatic couplers"	x	–	–	–	–	–	–	–	–	x	–
212 g	–	x	Uses "automatic couplers"	x	–	–	–	–	–	–	–	–	x	–
212 h	–	x	Coupler wear limits	x	–	–	–	–	–	–	–	–	x	–
212 i	x	–	Immobilizing coupler locks	x	–	–	–	–	–	–	–	–	x	–
219	x	x	Box-pedestal clearance ⅛-in.	x	–	–	–	–	–	–	–	x	–	–
220	x	x	Add between boxes and pedestals in.	x	–	–	–	–	–	–	–	x	–	–
221 a	x	x	Bolster maintenance	–	–	–	–	–	–	x	–	x	–	–
221 b	x	–	Clean trucks, tanks, frame	–	–	–	–	–	x	x	x	x	–	–
222 c	x	–	Truck part safety hangers	–	–	–	–	–	–	x	–	x	–	–
223 a	x	x	Center plate maintenance	–	–	–	–	–	x	x	–	x	–	–
225	x	x	Add "sand pipe extensions"	–	–	–	–	–	x	x	x	x	–	–
226	x	x	Cleanliness of wheels	–	–	–	–	–	–	–	–	x	–	–
227 h	x	x	Add "cracked flange"	–	–	–	–	–	–	–	–	x	–	–
227 o	x	–	Forbids welding on wheels	–	–	–	–	–	–	–	–	x	–	–
229 b	x	x	Cab safety glass and door stops	–	–	x	–	–	–	x	–	–	–	–
229 d	x	x	Cleanliness of floors and deck	–	–	x	–	–	–	x	–	–	–	–
229 f	x	x	Ventilation of cab	–	–	x	–	–	–	x	–	–	–	–
229 g	–	x	Passage between units	x	–	x	–	–	–	x	–	–	–	–
229 h	x	–	Provide fuse container	–	–	x	–	–	–	x	–	–	–	–
229 i	x	–	Protected fan openings	–	–	x	–	–	–	x	–	–	–	–
232	x	x	Steps and rails—lamps and windows	–	–	x	–	–	–	x	–	–	–	–
247 a	x	x	Protection of jumpers	x	x	x	–	–	–	x	–	–	–	–
249	x	x	Clean high voltage electrical equipment	–	–	–	–	x	–	x	–	x	–	–
251	–	x	Cleanliness of resistors	–	x	–	–	x	–	x	–	–	–	–
255 b	x	x	Fuel cut-off (See 323 b)	–	–	x	x	–	x	x	–	–	–	–
259	x	x	Exhaust stack height—See 327	–	–	–	x	x	–	x	–	–	–	–
262 a	x	–	Engine maintenance and operation	–	x	–	x	–	–	–	–	–	–	–
262 b	x	–	Cleanliness of engines	–	–	–	x	–	–	–	–	–	–	–
262 c	x	–	Maintain engine controls	–	x	–	–	–	–	–	–	–	–	–
303 b	–	x	Excludes forced circulating boilers	–	–	–	–	–	–	–	–	–	–	x
307 c	x	–	Test of boiler controls	–	x	–	–	–	–	–	–	–	–	x
308 a	–	x	Specifies "exterior surfaces"	–	–	–	–	–	–	–	–	–	–	x
308 b	x	–	Control test after storage	–	x	–	–	–	–	–	–	–	–	x
316 a	x	x	Safety valve discharge	–	–	x	–	–	–	–	–	–	–	x
317 a	–	x	Excludes forced circulating boilers	–	–	–	–	–	–	–	–	–	–	x
317 b	x	x	Discharge of drains	–	–	–	–	–	–	x	–	–	–	x
317 c	x	x	Add "fill-test valves"	–	–	–	–	–	–	x	–	–	–	x
317 g	x	–	Drip pans for gage cocks	–	–	–	–	–	–	x	–	–	–	x
317 h	x	–	Visual water return indicator	–	–	–	–	–	–	x	–	–	–	x
317 i	x	–	Fill-test valve on steam generator	–	–	–	–	–	–	–	–	–	–	x
320 b	x	x	Add "fill-test valve"	–	–	–	–	–	–	–	–	–	–	x
321 d	x	–	Extra strong piping in cabs	–	–	x	–	–	–	x	–	–	–	–
321 e	x	–	Defective boiler marked	–	x	–	–	–	–	–	–	–	–	x
323 b	x	x	Fuel cut-off (See 255 b)	–	–	x	–	–	x	x	–	–	–	–
327 a	x	x	Exhaust stack height—See 259	–	–	x	–	–	–	x	–	–	–	–
327 b	x	–	Remote boiler ignition	–	x	–	–	–	–	–	–	–	–	x
334	x	x	Brake cleaning after storage	–	–	–	–	–	–	–	x	–	–	–

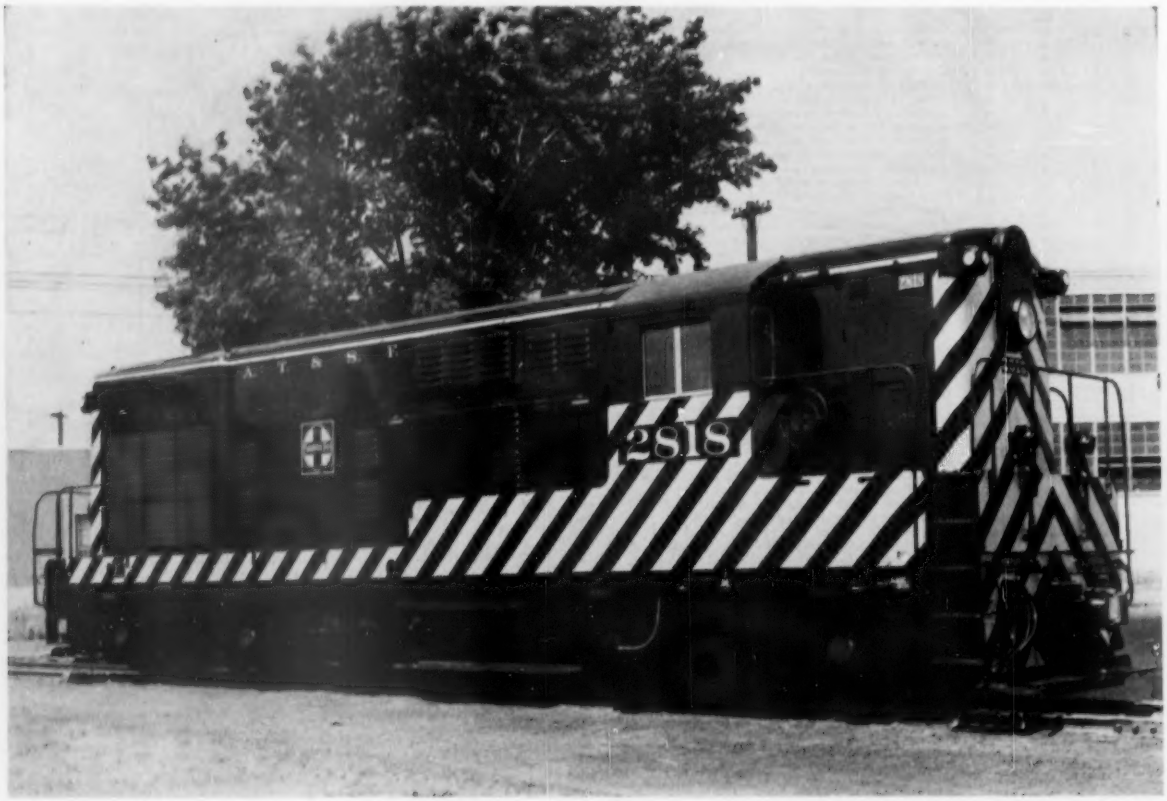


Locomotive inventory reported by AAR shows position occupied by declining steam on July 1st. The 24,325 diesel electric units are rated as 17,607 locomotives by their owners. The 572 electric locomotives have 663 units.

brake valves at the fireman's station in the cab and beside the end doors of all carbody-type units. Steps and handholds necessary to reach and service cab windows, headlights, marker and classification lights, and trolleys and pantographs would be mandatory. All fan openings on the locomotive would have to be adequately guarded. Extra-strength steam piping and adequate ventilation would be required in all cabs. The ICC's emphasis on cleanliness applies to all flooring and decking along with the running gear, fuel tanks, underbody and diesel engine.

Multiple-Unit Changes

While multiple-unit operation has long been an accepted practice on electric railroads, regulations dealing with it will be much more specific if the rules revisions become effective. Complete control of all coupled units from the operating cab would have to be assured. Wheel slips on all units would have to show in the controlling cab. The popularity of greater flexibility achieved by using automatic couplers instead of drawbars between units has been recognized by several rules revisions. The rewriting of the Locomotive Inspection Rules was brought about by the diesel electric, but its requirements, old and new, would apply to electric locomotives. Previous treatment of electric traction equipment seems to have been quite complete because only two minor rule revisions have been proposed.



Road switcher, such as this Santa Fe unit, evolved after the introduction of the diesel-electric. Equipped with steam generator and fitted for multiple unit operation, these locomotives can fill almost any railroad assignment. Recently the Virginian has ordered electric locomotives to be built as road switchers. These Virginian units will go into service during 1956.

"Lightweight Train Day"

(Continued from page 57)

puts out 150,000 Btu, burns diesel fuel and is installed in a luggage type of compartment under each car. The oil heater does not supplement the electric heat—when it cuts in, the electric heat is cut off and the oil heater takes the entire load.

Starting with a cold car just brought in from the yard, the division of load between the oil and the electric heat is as follows: First the oil heater takes over the load completely to raise the temperature of the liquid medium to 160 deg. It then cuts off automatically and the electric heat cuts in. It will stay on either unit the liquid is raised to 170 deg—if the capacity exceeds the heat loss to the outside air as it would on a mild day—or until the temperature falls to 150 deg, as it would on a cold day. Then the electric heat cuts off completely.

In either event, the next step is the oil heater cutting in. It does this immediately when the liquid temperature drops to 150 deg. On mild days, however, when the liquid climbs to 170, no heat from either source is added during the period when the temperature is falling from 170 to 150 deg.

The electric heat is either full on or full off. It is not modulated. The reason is that the 12,500 Btu put out by the electric heaters is but a fraction of the total required. It is, therefore, somewhat in the category of a modulated amount in itself.

It is GM's intention to release this train and a second exactly like it for test and demonstrations about Nov. 1, one to the PRR, the other to the NYC. Thereafter, one train will be made available to Eastern railroads, beginning with the New Haven, and the other to Western roads, commencing with the Santa Fe. First revenue service contemplated is between Chicago and Detroit by the NYC next Spring.

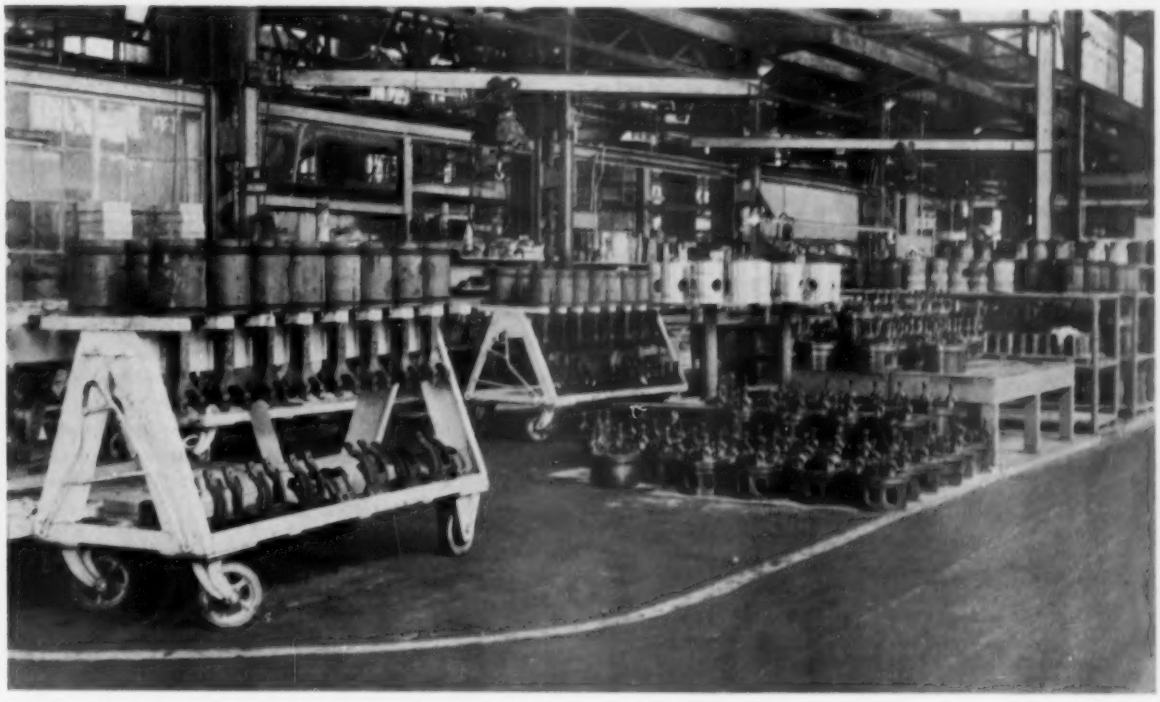
How to Plan A Diesel Shop

(Continued from page 54)

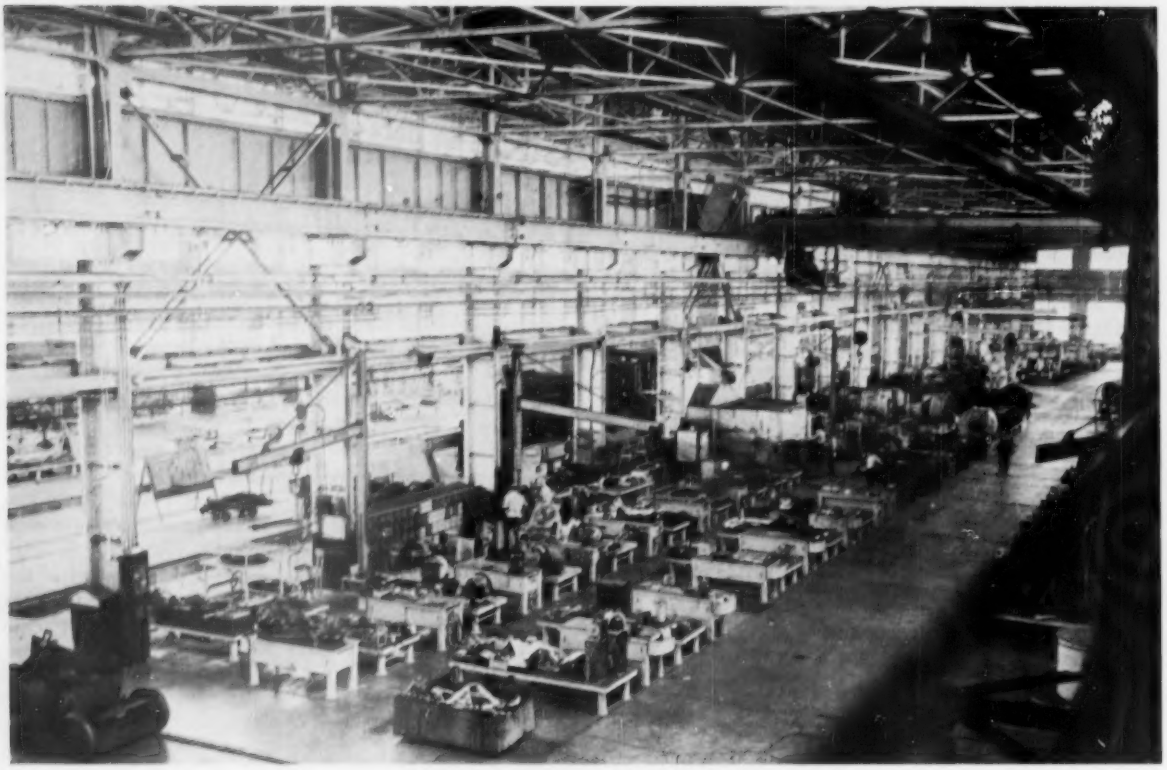
do not have the work volume to justify the shop conversion costs, and the purchase of the required machinery and tools. In such cases it is probably a more economical plan to use the locomotive builder's services and abandon their own for other purposes.

Some railroads have sufficient diesel power to justify one heavy maintenance shop and abandon all others. In the smaller size shops, the customary power plants can be replaced with small industrial steam generators or a standard one used on diesel locomotives.

This report was an annual meeting presentation of the Shop Planning Committee of the Locomotive Maintenance Officers' Association. R. E. Harrison, Southern Pacific was chairman.



Good housekeeping generally means good workmanship—Santa Fe diesel shops, San Bernardino, Cal.



How Railroads Can Benefit by

Planned Locomotive Maintenance

L.M.O.A. offers positive electrical and mechanical locomotive maintenance program which can be adapted to the needs of individual railroads

■ The Locomotive Maintenance Officers' Association Committee on Diesel Maintenance, at the September 12-14, 1955 meeting, held in Chicago, offered a planned locomotive maintenance program which could serve as a guide to member railroads. The plan does not cover work in detail, but rather emphasizes the importance of planning. The findings of the report were obtained through observation of practices on several railroads, from the study of numerous reports and from test results. In producing its findings, the committee has concluded that it is desirable in the interest of simplicity to present a maintenance program covering a single type of locomotive. The EMD F-7 and F-3 locomotives were selected for this purpose and it is believed the program may be adapted to any locomotive, whether 25 or 300 units are involved. The following is an abstract of it.

A positive maintenance program is, and must be, a planned program. For a starter the manufacturer supplies a maintenance program. This is very helpful and should be used until, and only until, enough experience is gained and some records are accumulated.

The experience gained and the records of road failures and defective parts removed, including their service life, plus test periods of individual components, will be most valuable in planning and administrating a positive maintenance program.

There is very little danger of a fleet of locomotives getting in bad mechanical condition during test periods to determine the frequency each device or part should be serviced. It is very important that lubrication schedules be watched closely.

Starting with a new locomotive or one overhauled, all parts or components are considered as having zero

service mileage, and as each part or device has a predetermined service life expectancy, only light running repair and inspection should be necessary before two years.

Planning on this basis 24 monthly maintenance sheets are made up (numbers 1 through 24), the work load on these 24 sheets is well balanced and the number of items is kept to a minimum. Careful study is given each item on the sheets, first to determine for sure that the work is necessary and, if so, at what frequency. Next, care is taken to distribute the work on the sheets in order to keep two or three men from working in the same location during the same maintenance period.

Each item of work listed on the sheets must be done at the specified time, and not deferred. Deferred work will accumulate and eventually unbalance the schedule. If each item of work to be performed is listed at the proper frequency the chance of failure is kept at a minimum.

At the time this cycle of the work has been completed, all 24 sheets have been used, over a 23- or 24-month period, a minimum amount of work and inspection has been performed, and the locomotive has been out of service a minimum amount of time.

As we cannot expect the locomotive to perform indefinitely without heavier maintenance work and as this is the scheduled time, the locomotive is shopped for some heavier than usual work. However, we still consider this work as running repair or work to be done at a running repair shop.

At this shopping, work included is renewal of power assemblies, scavenger blowers, oil coolers, governors, cleaning hatch, inspection of radiators, renewal of air compressor cylinders and pistons and tightening of the entire engine.

The electrical work done at this time is a complete and thorough cleaning and inspection of all electric cabinets, cleaning of main generators, alternators, slip rings and terminal block, painting of riser- and creepage-surfaces and servicing of storage batteries.

After the above work has been completed, the locomotive is load tested and returned to service for another two-year cycle identical with the first cycle except for a main bearing inspection which is made each three years.

Two years after the second cycle, the locomotive goes to the heavy overhaul shop for complete overhaul including engine, main generator, all electric equipment, trucks and car body.

The time elements and the number of maintenance sheets used in this illustration of the program planning is based on locomotives in heavy maintenance service where fuel consumption and the load factor are well above the national average.

It remains that each individual railroad must determine the most economical time or service life before power assembly renewal, as the power assemblies are the best and surest guide to use in building a maintenance program. They should be the controlling factor.

After the service life of power assemblies has been determined, then all other routine items of work and inspections should be divided over the number of months, and the same number of sheets printed as there are months between assembly change out.

For illustration, should thirty sheets be used over a period of thirty months, then on the same basis, the overhaul time would be extended to seven and a half years, instead of six years used in the preceding illustration.

Also included in this program is a book of Standard Procedures. The purpose of this book is just what the name implies, that there will be standard procedures to follow in detail, explaining how each job or inspection itemized on the maintenance sheets will be done.

The success of any positive maintenance program is dependent upon the care exercised by the supervisors of such a program to insure that all factors affecting the program are faithfully and properly carried out. We are all familiar with the old proverb which has its opening theme, "For want of a nail, the shoe was lost," and ends with the fact that the battle was lost. This same philosophy applies to a positive maintenance program. There are many factors which affect the success of such a program. Although some of these factors are simple ones, they all must be applied properly, or else the program will not be successful. The committee, therefore, presents a review of some of the major factors which assist in promoting a successful positive maintenance program—in fact it goes a long way in building the program.

Brushes

Use of proper grade and quality of brushes on diesel-electric locomotive main generators, traction motors and auxiliary is important. The extensive brush testing on locomotives over the past ten years by equipment and brush manufacturers as well as railroads, demonstrates that locomotive brush requirements differ from the needs of the electrical industry in general. Early diesel brushes were of the same grade as used on mill motors and similar industrial equipment. Today, the most generally applied brushes are those developed specifically for railroad use, by a few brush companies.

All the problems are not yet solved. This is due partially to changing speed and load requirements of modern railroading and partially to the fact that squeeky wheels get the most grease. As long as main generators and traction motors needed prime attention, auxiliary equipment received less attention. Now that good grades are available for most of the big equipment, auxiliary equipment problems can get better attention.

Brush company technical people say there is no direct relation between measurable physical properties of carbon brushes and their exact performance on commutators. There are general relations such as the highest electrical resistance in a series of similar grades that will probably be the best commutating grade. But two high resistance grades made from different raw materials or by two different processes will not commutate the same. The real test of a brush is how it works on a machine.

Proper brushes should have the following operating characteristics:

1. Ability to ride and commutate on commutators of reasonably maintained equipment under all railroad load and vibration conditions. A good brush grade will develop a good film on the commutator.

2. Strength enough to give full brush life without breakage.

3. Low friction and low commutator wear over wide range of electrical loading.

4. As long a life as possible without causing commutator wear or interfering with commutation and friction.

Sealed grease traction motor bearings are proving advantageous and bring about considerable savings in maintenance over the oil type, which have to be serviced every maintenance period.

Flashovers

Flashovers are a major problem in a running repair program, and very little progress is being made towards their elimination.

We believe that a lot of our flashovers are caused by momentary control circuit interruptions. These interruptions can take place at a number of interlocks and switches, therefore, we recommend that closer inspection and adjustments be made of all interlocks and switches. The new enclosed interlocks should go a long way towards correcting these failures.

Circuit interruptions can and do take place in control jumper cables. The new hose and loose or free wire cable should improve this condition, also a very light film of lubricant wiped on the receptacle contact point will be helpful.

Lubricating Oil

In any successful positive maintenance program, the use of a heavy duty diesel engine lubricating oil is a must. It has been said that the lubricating oil is the life blood of a diesel engine. Poor quality lubricating oils may fail to provide satisfactory oil films between moving parts and thereby permit to metal-to-metal contact, which manifests itself in the form of galled surfaces and excessive wear, necessitating premature replacement of the engine component parts.

In addition to preventing wear between moving surfaces, the lubricant in a diesel engine is required to serve as a coolant. It must carry away heat generated by combustion of the fuel from many of the component parts in the locomotive. In its role as a coolant, the lubricating oil is subjected to high temperatures and high pressure in the presence of oxygen. It must be so refined and so fortified with suitable additives that it will resist oxidation and the tendency to form sludge and deposit lacquer and other oil oxidation by-products on the various engine components.

The use of other than top quality heavy duty railway diesel engine lubricating oils may accelerate the wear and engine deposit accumulation to such an extent that a positive maintenance program can be seriously dislocated due to premature removal of engine components.

Filters and Screens

Although a high quality railway diesel engine lubricating oil will provide the greatest assistance in maintaining internal engine cleanliness, it must be given every assistance in performing this task. This assistance must be provided by first reducing to the minimum possible, contamination of the lubricant by extraneous contaminants, and secondly, by removing contaminants by efficient oil filtration. A primary source of extraneous contamination in a diesel engine results from air-borne dust. Although the percentage of dirt in the intake air may amount to only a few tenths of a per cent, the tremendous quantity of air consumed by the engine in operation results in hundreds of pounds of air-borne dirt being passed through the combustion chamber.

This dirt is frequently abrasive in nature and, therefore, causes wear in the combustion chamber as manifested by wear on the piston ring, piston ring grooves and cylinder liners. Frequently, the dirt works its way past the rings into the crankcase of the engine where it is then distributed by the oil throughout the engine system.

Early railway diesel engines were equipped with oil type impingement filters on the engine air intake alone. In order to improve engine air filtration, car body filters were subsequently added. Continuing research to improve air filtration has lead to the development of dry centrifugal and oil bath engine air filters.

These latter designs of filters are substantially more efficient than the oil impingement type filters. Although their cost of application is higher, test data indicate that considerable savings may be realized due to reduction of ring and ring groove, piston skirt and liner wear. Furthermore, the equipment has been so designed as to reduce substantially, or practically eliminate, any servicing. Hence, the increased cost of application is frequently offset by the elimination of routine maintenance.

In order to assist the diesel engine lubricating oil in performing its task, it is of utmost importance that the lubricating oil be kept clean and free of foreign materials. In addition to the sand and dirt which may enter the diesel engine lubricating oil through the combustion chamber, there are many other contaminants which are introduced into the oil as a result of maintenance work performed on the engine. Such items as lace wire, welding spatter, metal shavings, broken light bulbs and light bulb filaments have been found in the lubricating oil. Small strings or lint from wiping rags will combine with metallic particles into small balls that may cause piston-cooling pipe stoppage and piston crown failures.

Bearing inspections frequently reveal deep and wide radial grooves cut into the bearings by the passage of metal particles through the oil lines to the bearing where clearance at that point becomes small enough so that the foreign matter scores the bearing. All of these sources of contamination can be virtually eliminated by keeping the engine lube oil screens in good repair. The committee wishes to point out that this is one of the minor maintenance items, which if ignored, can seriously affect the overall maintenance of the engine, since tears in the filter screen will permit passage and introduction of these particles into the engine lubricating system where they may cause serious damage.

If engine air intake filters and lube oil filter screens receive proper attention, then the diesel engine lubricating oil filters are in the best position to perform their task of removing all other contaminants from the diesel engine lubricating oil.

Diesel engine lubricating oil filters constitute an expensive item in engine maintenance. The cost of labor to change out the filters, and the loss of engine lubricating oil absorbed by the filter must be added to the base cost of the filter in determining its total cost.

If filtering efficiency is equal between two types of filters, the filter having the greatest capacity, and hence, the

longest service life, should prove the most economical to use. Diesel engine lube oil filters in railway use are either of the cotton waste or the paper disc type. The physical and chemical mechanics of filtration with these types of media are not yet clearly understood and the committee cannot, therefore, offer any recommendations regarding a type of filter to be used. It does recommend that whatever filter is used, it should be selected on the basis of filtering efficiency and filter life, if optimum maintenance is to be achieved.

Although the lubricating oil filters can successfully remove solid contaminants from the diesel engine lubricating oil, they are incapable of removing contaminants which form solutions or emulsions.

Water—Dielectric and Ultra-Violet Detection

One of the contaminants is, of course, water, resulting from water to oil seal leakage.

The successful detection of water in the lubricating oil sample is of great importance, since it emulsifies with the oil, and the reduced film strength of the emulsion may permit metal to metal contact, and result in premature failure of moving components in the engine.

Corrosion inhibitors used in the cooling water tend to promote premature oxidation of the diesel engine lubricating oil.

A quick and easily performed shop test is desirable to detect the presence of water in the lubricating oil, and for this purpose, some railroads use a small hot plate. The plate is heated until it reaches a temperature of 400 deg F, which is controlled by the use of a temperature crayon. A few drops of the oil to be tested are placed on a hot plate, and if any water is present, it can easily be detected since it tends to boil or fry out of the oil sample.

Another device consists of a dielectric strength unit where a sample of oil is placed between electrodes, and the presence of the water reduces the dielectric strength of the oil which is indicated by a suitable meter or light.

Dilution of the diesel engine lubricating oil by the diesel fuel must also be controlled.

A variety of oil viscosimeters suitable for determining the reduction in viscosity caused by diesel fuel are not available for determining the presence of dilution.

When it has been established that the oil is being diluted by the fuel, it is then necessary to locate the source of fuel leakage and correct it. One technique is to wipe down the top deck free of oil; apply pressure to the fuel distribution system and closely observe it for leaks. This is a difficult and time-consuming procedure, and recently it has been found that the use of ultraviolet, (more popularly known as black light), has proven advantageous in detecting and eliminating these points of leakage.

Generally, the oil and fuel oil, when observed under black light illumination, present a different fluorescent appearance. The lube oil will appear as a gray white or dirty white, whereas the fuel oil will appear purple in color. These differences are easily discernible and permit rapid observation and location of leaks with a minimum of labor. Portable ultra-violet light equipment is available for this use.

Routine injector tests, of course, must also be performed for the purpose of correcting malfunctioning injectors which may contribute to the dilution problem.

Cooling Water

The water used in the cooling water systems of the engines must be properly treated to prevent a deposition of water soluble salts and corrosion in the cooling system. When raw water supplies have highly dissolved contaminants, it may be necessary to provide softening or demineralizing water treatment facilities for the elimination of these undesirable solids. Regardless of whether this is necessary, the water must then be treated with a suitable corrosion inhibitor to prevent corrosion of the various metals in the cooling water system.

Since proper corrosion inhibition is only obtained when the inhibitor is maintained at a special optimum level, the concentration of the inhibitor in the cooling water should be regularly tested and replenished when tests indicate this is necessary.

To neglect such precautions will lead to corrosion of the cooling water passages in the engine, plugging of the water coolers, inefficient heat transfer, and multiple difficulties in engine maintenance.

Cleaning

In addition to keeping the engine clean on the inside, it is, of course, of cardinal importance to keep it clean on the outside, including the engine compartment, rotating electrical and electrical control equipment. A regular cleaning procedure utilizing proper cleaning materials and methods should be adopted.

Air filters of main generators and electrical cabinet protection are proving most successful in reducing maintenance of these components. The application of these filters has permitted some railroads to extend cleaning intervals from once each month, to once each three months. It was necessary to remove and relocate the air compressor after cooler, in order to provide room for the filter housing. This has produced an additional advantage since the air compressor after cooler is now located on top of the radiator hatch. The air passed through the after cooler is lower in temperature. The new after cooler does not offer as much resistance as the older design and provides a cooler running compressor. In addition the compressor discharge oil separator has been eliminated, removing further restrictions to the flow of air.

Another maintenance saver that is available is a fitting for connecting water or oil lines replacing rubber hoses. This fitting incorporates two "O" rings that are clamped on metal tubing and allows a flexible tight seal. This fitting is not new to the plumbing industry, but is new to the railroad maintenance people.

Automatic blowdown for removing water from the main reservoirs has proven to be a most worthwhile addition. The application of this equipment has greatly reduced air brake malfunctioning.

Magnetic Particle Inspection

When it becomes necessary to overhaul engine component parts, this work should be carefully done in accordance with the engine builders' recommendations. The use of fluorescent magnetic particle inspection techniques such as Magnaflux and Magnaglo is strongly recommended by the committee. These techniques will locate cracked and defective components and prevent their reassembly and reapplication to the engine where they may fail

prematurely. Valves and other non-magnetic parts in the engine should be subjected to careful inspection by a dye penetrant inspection method in order that defective parts may be located and eliminated before they are applied to the engine where expensive failures may develop as the result of their application.

The lubrizing of reconditioned pistons is very advantageous. The Parco Lubrite treatment produces a non-metallic oil absorbent coating on the piston surface that aids rapid break-in and reduces subsequent wear of the piston and liner.

Piston and liner scoring on load test following assembly changeout has been virtually eliminated and the premature removal of power assemblies due to scoring before they have run their expected mileage has been greatly reduced where lubrizing has been adopted.

The Test Department

It is unlikely that any diesel maintenance program could become the "Positive Maintenance Program" without the aid of a test department. A test department is an essential part of the program.

Its analysis of a sample of oil taken from the crankcases of engines provides information that can and does save thousands of dollars monthly. This information properly correlated reflects mechanical conditions with such surety that many phases of the engine mechanical program could be controlled by its use.

Loss of crankshafts should be practically eliminated by laboratory control and the present steel back bearings. This ever present hazard is thereby reduced to the very minimum.

The analysis provides us, the mechanical personnel, with information of such nature that we will have positive control of the lube oil, and thereby save many oil changes.

The test department is very instrumental in many phases of the shop work or related work, such as water treatment control, fuel oil specifications, lubricants, cleaning compounds and procedures, paint, etc. It helps develop techniques in the use of dye penetrants, lubrizing, Magnaglo.

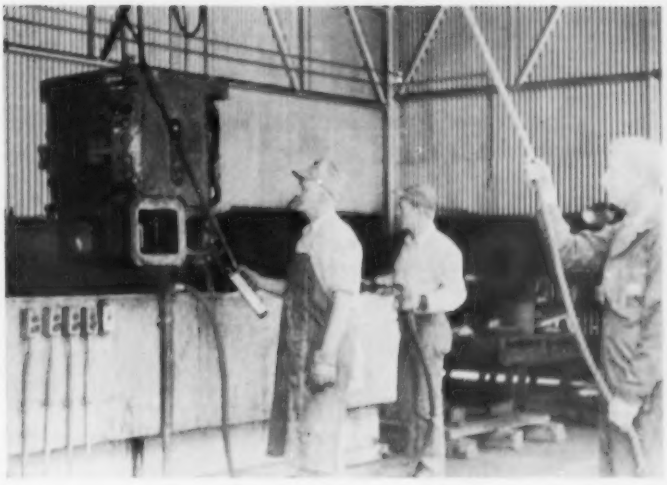
Left: Exterior of air-conditioned Hudson & Manhattan Tube car showing air inlets. Outside air enters through the dynamic grilles, permitting fresh air to circulate for condenser and car cooling. Center: Interior of the car showing twin air distributors in ceiling where fans formerly were installed. Air is circulated uniformly through car by the cooling system. Right: Safety package-type conditioner,—10 to 12 tons capacity. This single unit contains the motor-driven compressor, air-cooled condenser, evaporator, heat coils and controls, and is the first installation of central air conditioning in an underground rapid transit service.

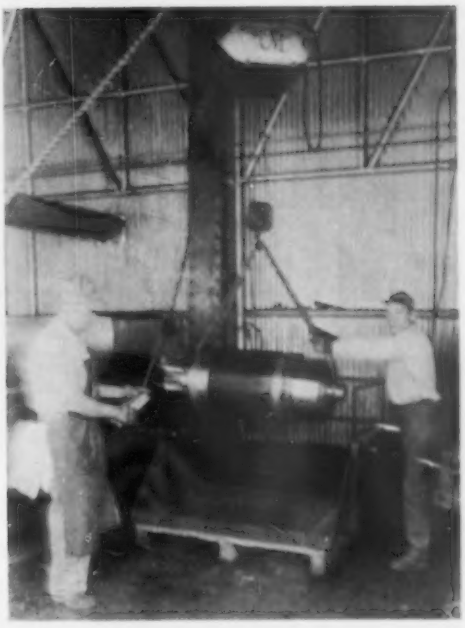
Hudson Tubes Shows First Air-Conditioned Subway Car

The Hudson & Manhattan, Hudson Tubes, staged a demonstration run of an air-conditioned passenger car from Hudson Terminal, New York, to Hoboken, N. J., and return. The air conditioning equipment was supplied by the Safety Car Heating & Lighting Co., and is installed in one of the car vestibules. Located this way, in the passenger space, it necessitates closing one vestibule door. Electrical equipment is placed in an adjacent locker which requires the space of one passenger seat.

The equipment is in package form and has a capacity of 12 tons. The three 600-volt motors driving the compressor, the condenser cooling fan and the air circulating fan have a total capacity of 18 hp. Control equipment operates from the car's 64-volt circuits. A total of 3,000 cfm of air, 25% of which is fresh air, is delivered through a central duct to air diffusers in the car ceiling. The car was 45 ft long. A differential of 10 to 15 deg between ambient and inside air is possible.

A similar car employing four individual air-conditioning units was demonstrated on lines of the New York City Transit Authority, and will be continued in service to determine its performance under full service conditions.



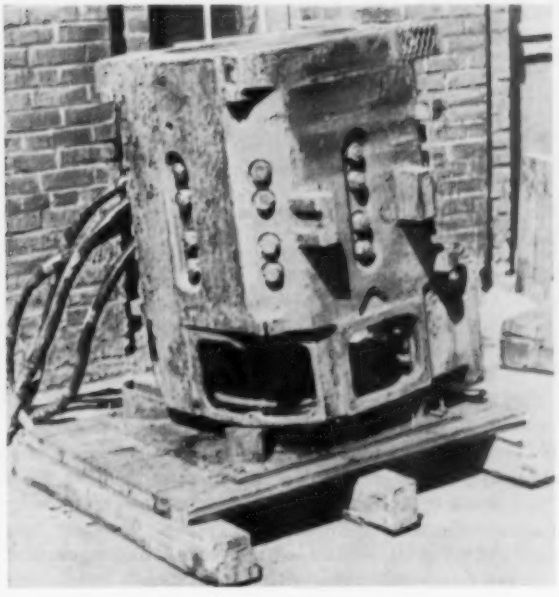


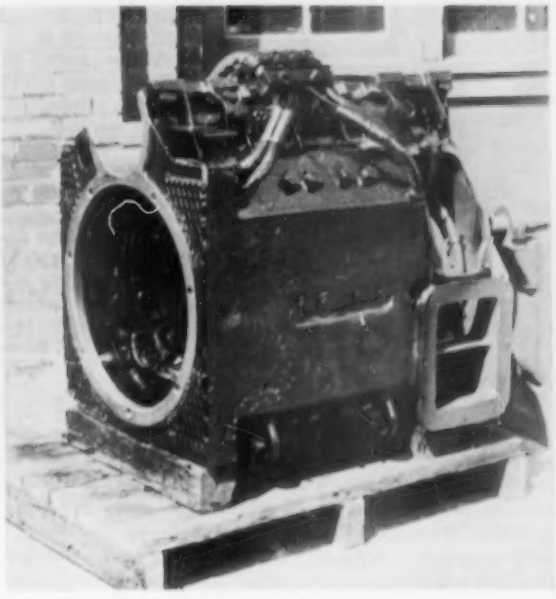
A traction motor frame goes into the degreaser. (above)

A cleaned armature is placed on a rolling stand in which it is supported on lathe centers. (at right)

The complete cleanliness of the cleaning process may be seen from the appearance of the exterior of this frame. (lower left)

A motor frame after black surface varnish has been applied. (lower right)





Self-Timing Degreaser

■ The Southern Pacific has provided an answer to a long-standing argument about vapor degreasers for electrical equipment. Non-users say, "I am not sure that the degreaser solvents do not penetrate the varnish so as to reduce its insulating quality and its mechanical strength." Users reply, "The solvent does take off an outer film or skin of varnish and with the removal of this film goes all the brush carbon and brake-shoe dust which has become embedded in the surface of the varnish. The little varnish that is removed is then replaced in the impregnator." All agree that for electrical insulation, the degreaser should be used discreetly.

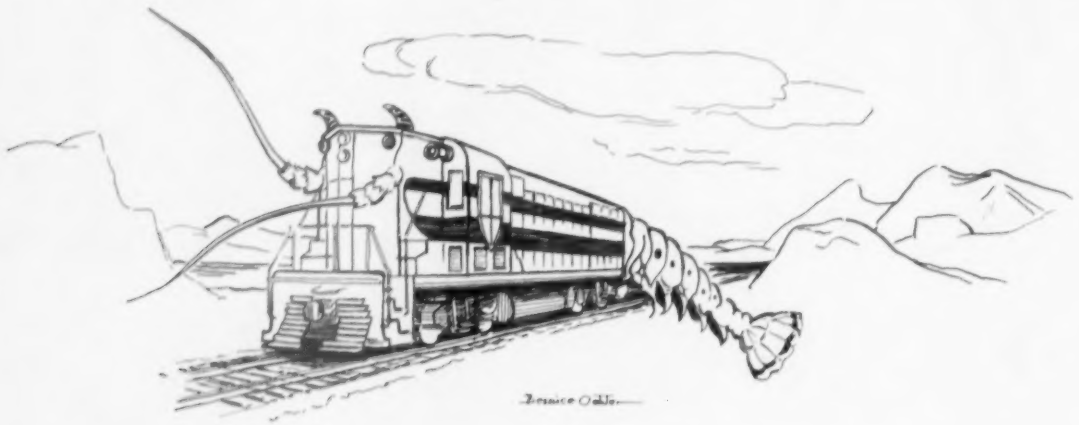
A means of insuring the removal of imbedded dirt surely with a minimum of degreaser time has been evolved in the Sacramento, Calif., shops of the Southern Pacific. Basically, it consists of impregnating the field or armature coils with a varnish which is highly resistant to trichlorethylene, and then adding a spray coat of a

varnish which is easily removed in the degreaser. Dirt is thus removed quickly, and the parts only need to remain in the degreaser for a short time.

In the process of cleaning, the complete motor is first hoisted over the degreaser tank and hosed with liquid solvent. After disassembly, the motor frame is held above the vapor line while a flow of solvent is used to clean the exterior and the ventilating screen. It is then lowered into the vapor for 1½ minutes, raised and hosed.

Armatures are treated in a similar manner as frames.

From the Diesel Maintainer's Note Book



The Diesel That Played Crawfish

By Gordon Taylor

A GP-7 was operating as a single unit on a local freight train. Everything seemed to be all right until it became necessary to make a back-up move. This was done without trouble, but when it became necessary to go forward, the unit simply refused to make a forward movement. It could make a reverse movement, but nothing that the crew could think of would enable them to go forward.

The crew called the master mechanic by phone, who very wisely suggested that they examine the *CD* interlock that is part of the *Forward* switch located at the top of the Reverser drum. For some reason, the crew could not locate the suggested cause of trouble.

It was necessary for an electrician to drive about 70 miles to the scene of the trouble where he found that the *CD* interlock of the *Forward* switch was bent in such a manner that it was not making a connection with the rotating contact located on top of the reverser drum. It required but a few minutes to clean the *CD* contact fingers and bend them into position where they could set up the controls necessary for forward operation.

The situation raised the question "What is necessary to cause a locomotive to operate in reverse direction?"

It is necessary to move the reverser handle in the desired direction. This closes a contact in the reverser control drum, located at the control stand.

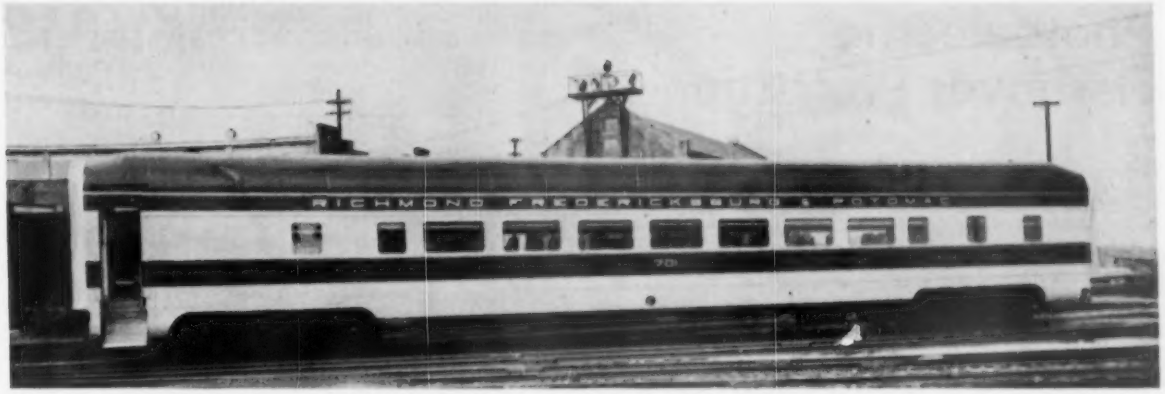
The contact set up by movement of the reverser handle energizes the magnet valve on the main reverser drum that causes the air-operated cylinders to throw the reverser drum in the desired direction.

At the top of reverser drum, there are two sets of contact fingers. One pair of fingers is known as interlock *CD*, which is necessary for forward movement. The other contact fingers on top of the reverser are known as interlock *EF*, which is necessary for reverse movement. These directional interlocks close the circuit through the isolation switch to energize the series and parallel power contactors.

In this case, the unit had been operating satisfactorily in the forward direction just before being operated in the reverse direction. The trouble almost had to be either a broken wire or a defective contact on the interlocks on top of the reverser drum.

In such a case, it would be proper to open the isolation switch, then examine the directional interlocks to see if they are dirty or bent in position where they cannot be contacted by the rotating contact on top of the main reverser drum.

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.



Exteriors, as well as interiors, have been restyled.

RF&P Modernizes Coaches

■ As part of its current passenger-equipment modernization program, the Richmond, Fredericksburg and Potomac is rebuilding six of its earlier air-conditioned coaches, upgrading them to parity with the latest type of streamlined cars. The work, which includes installation of a new 110-volt electrical system, increased air-conditioning capacity, fluorescent lighting, and other new features, is being done in its own shops in Richmond, Va.

The cars will have incorporated all the features of today's newest air-conditioned cars.

The interior of each coach is being completely rebuilt and the exterior streamlined. Narrow single-glazed wood sash are being replaced with wide double-glazed metal sash, supplemented by cable curtains. For utmost seating comfort, bucket-type seats are being replaced by de luxe rotating-reclining seats with adjustable headrest and footrest.

Other features include vestibule folding steps, vestibule trap doors, tight-lock couplers, rubber draft gear, rubber side bearings and electro-pneumatic end doors that open at the touch of the finger and then close automatically.

The former incandescent-light fixtures and narrow luggage racks are being replaced with fluorescent lights and solid luggage racks 20 inches wide, under which are located 26, 30-watt fluorescent cove lights, which extend along both sides of the entire length of the main body of the car. For additional illumination, 26 individually controlled 15-watt fluorescent seat lights are also located beneath the baggage racks. Other fluorescent lighting includes five 30-watt center lights, five 30-watt rest-room lights and five 15-watt hallway lights.

The refrigerating capacity of the air-conditioning system is being increased from six to eight tons. Other new electrical equipment includes a radio and public-address system.

The new electrical system employs as a primary source of power a 25-30-kw axle-driven generator with an output of 26 kw at 780 rpm and 35 kw at 2,470 rpm. The power during non-generating intervals is furnished by an 88-cell A12H Edison Nickel-Iron Alkaline storage battery, having an 8-hour capacity of 55.47 kw-hr. A-c power for the

Fluorescent lighting is used throughout, with individually-controlled seat-lights.

fluorescent lamps, radio and public-address system is furnished by a motor-alternator having a capacity of 2½ kw.

Incandescent lamps, exhaust fans and a water cooler represent a total maximum load of 560 watts, and together with a 1-hp air-conditioning-blower motor are supplied from the d-c side of the system through load voltage regulation. Also operating on the d-c side of the system, but as unregulated loads are a 12-7 ½-hp refrigerating-compressor motor and a 1-hp condenser-fan motor.

The battery is housed in two boxes of 40 and 48 cells, respectively, suspended from opposite sides of the car. Short jumpers are employed for tray-to-tray connections which effect a reduction of 1½ to 2 volts in voltage drop as indicated by test-readings at the electrical locker.

A new safety feature incorporated in these cars protects the electrician when he is connecting the motor-generator to a-c yard power. The motor-generator starting button is located five feet away from the a-c receptacle so that, after plugging in the leads, the electrician must be at least that distance away from the receptacle before he can start the motor-generator.

Photoelectric Flashover Protection

To the Editor:

John W. Brown, in your September issue, suggests the possibility of using a photocell to augment the impulse relay providing additional protection to the commutator, brushes and brush holders of the diesel-electric locomotive main generator. The idea of using a photocell to detect excessive arcing, ring fire and flashover is very appealing, but it is subject to certain practical considerations which would appear to make it doubtful that a successful application could be made. A photocell arranged to scan the commutator between brush holders would be in a good position to detect flashovers of the type that are now detected by the impulse relay or the ground relay, but this would not provide additional protection. It would also be in a position to pick up light from ring fire but this light is of such low intensity that a device sensitive enough to detect it could be expected to be subject to false operation as a result of stray light.

Positioning of the photocell to scan the commutator at some other point would be subject to similar difficulties. Providing for protection against damaging arcing or flashover which would not be detected by the impulse relay or the ground relay would require in the photocell an ability to discriminate which it might well be impossible to build into it.

While it cannot be said that the idea is without merit, the conditions presented above have thus far discouraged any consideration on our part of attempting to develop a practical photocell device of the type suggested by Mr. Brown.

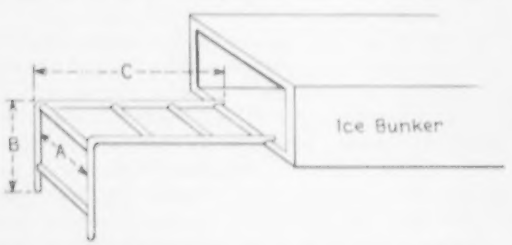
W. A. Kirsch
Westinghouse Electric Corp.

Icing Rack

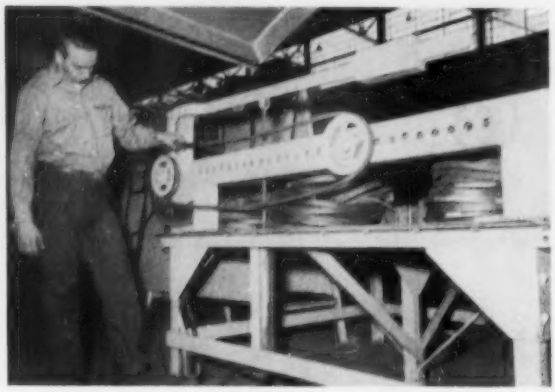
By David H. Noble

■ Icing air-conditioned cars with standard three or four hundred pound blocks is an easy task with the rack shown in the sketches. Simple to build from scrap pipe, and light enough to move from car to car, it eliminates strained muscles, broken toes, and train delays that come when car forces attempt to manhandle ice without proper tools.

And, in addition to speeding the icing operation, it will improve air conditioning performance. A 300-lb block melts more slowly than six, 50-lb cakes, and the possibility of a car running out of ice is greatly reduced.



Made of sections of pipe welded together; the dimension *A* is controlled by the size of the ice cakes used, *B* is controlled by platform height, and *C* is made to suit space requirements. The ends of pipe sections resting on the bunker are flattened.



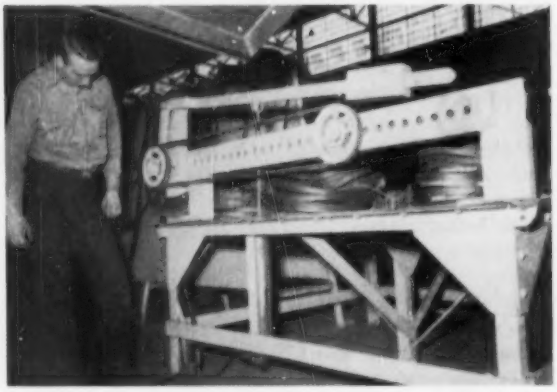
Pressure on a foot treadle lifts the weight for applying or removing belt.

Belt Matcher

■ To assure satisfactory operation and long belt life, Vee belts which are to be used on multiple-belt pulleys must all be the same length. The device shown in the illustrations makes the selection easy. Stepping on a treadle raises the horizontal arm of the L-shaped lever which has a weight on the long end, and a Vee pulley on the short end of the L. The lever is pivoted just above the operator's hand. Just below the left-hand pulley, is a pointer which is an extension of the short end of the L, and which moves back and forth over a scaled quadrant as the weight is raised or lowered.

With the weight in the raised position, a belt is placed over the two Vee pulleys and when the operator removes his foot from the treadle, the weight applies tension to the belt. Belts under the same tension having the same length, as indicated on the quadrant, are selected for multiple operation.

The holes in the horizontal member provide for belts of various length and the weight may be slid along the upper bar to adjust belt tension.



With tension on a belt, its length is indicated on a quadrant below the left-hand pulley.

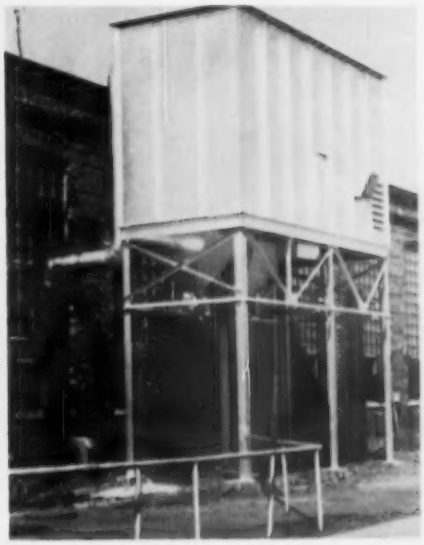
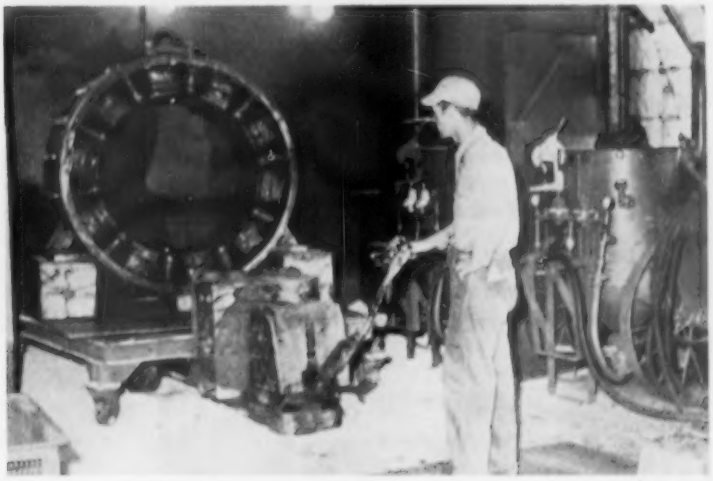


Fig. 1 (Upper left)—Wood pellets are used to clean metal parts of frames and armatures.
Fig. 2 (Upper right)—Used cleaning materials are collected in the separator which may be unloaded through bottom hoppers.
Fig. 3 (at left)—The insulation on a generator frame being cleaned with ground corn cobs.
Fig. 4 (below)—When the work is finished, a Transporter moves it out of the booth on the skid-positioner.



Corn Cob and Wood Pellet Cleaning

■ The Rock Island has installed means of blast cleaning insulation and metal parts of traction motors and generators in its electrical shops at Silvis, Ill. The equipment includes a Pangborn booth, (Fig. 1), complete with the necessary pressure tanks, hoses, nozzles, etc., and a separator, located outside the shop.

Ground corn cobs are used for cleaning insulation surfaces, and wood pellets are used for the metal parts of frames and armatures. The cleaning materials are not reclaimed, but are collected in the outside separator, from which they are later removed through bottom hoppers.

Parts being cleaned are placed on a castored skid, on top of which is a turntable or positioner. The turntable enables the operator to turn his work to any desired position as shown in Figs. 1 and 3.

When the work is finished, or when new work is to be moved into the booth, it is done with a battery-powered Transporter, as shown in Fig. 4. It is run der the skid, and its platform raised just enough to take the weight of the skid and the motor or generator part. The castors on the skid then act as balancers while the machine is moved out to where it can be handled by a crane.

Move your freight cars with trouble-free

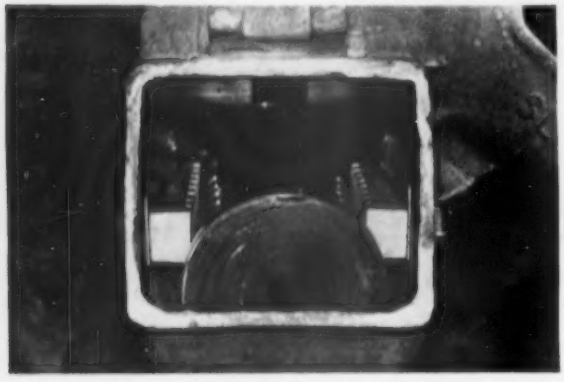
How R-S Journal Stops and Satco lining metal can reduce journal box servicing and maintenance requirements . . . can speed up train departures and eliminate need for servicing en route.

SATCO and R-S Journal Stops make the conventional waste pack an efficient lubricator. They give better bearing performance at the same time they reduce existing maintenance and servicing requirements. They eliminate old problems and *do not add any new ones.*

Equip all cars in a consist with Satco and Journal Stops and journal box inspection could be on a periodic basis—would not be required after each humping or switching operation.

The reasons: First, you seldom have to adjust packing and actual adjustment takes less time; second, you keep more oil in the packing, get constant lubrication; and third, bearings run cooler increasing vital oil film thickness.

R-S Journal Stops keep the packing right where it belongs—1" below the journal center line. Time and again road service tests with Journal Stops have proved that packing is undisturbed even after trips of 5000 miles or more. Without R-S Journal Stops, whenever there's a road or switching impact, or heavy brake application, you force the axle out from under the bearing. That crushes the dust guard, forces the box to rise, and squeezes the packing against the bottom of the journal—squeezes the



View of R-S Journal Stop installation with box jacked and bearing, wedge and packing removed. Note shims which permit maintaining nominal clearance on undersize journals.

Two of bearings removed after 38 months service in freight car equipped with R-S Journal Stops. All bearings were in such excellent condition they were reapplied. Crown has extended to point where it is wider than required for "fitted" bearings—but lining has not overrun.

MAGNUS METAL CORPORATION

TO DESTINATION

journal boxes!

oil out of the packing, too. This loose oil is free to splash out the back or front of the box—sometimes does before it can be reabsorbed.

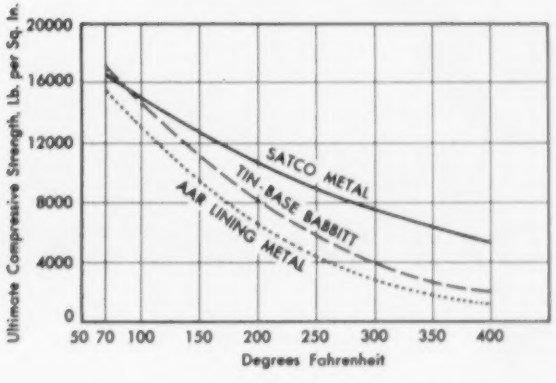
Journal Stops prevent all that. For more miles than necessary to cross the country, you can maintain oil-to-packing saturation ratios of better than 2.75 to one—more than adequate to lubricate efficiently. And because you don't compress the packing, you maintain constant journal-to-packing pressures—assure a constant feed of oil to the bearing.

WHAT SATCO CAN DO

Use Satco-lined bearings and R-S Journal Stops, and you lick the major problems that lead to bearing troubles. Bearings run about 20° cooler on Satco. You get lower operating temperature, higher operating oil viscosity, and a thicker film of oil. That all adds up to increased operating safety and better bearing performance.

Satco has a melting point 150° higher than standard AAR babbitt. It's harder and stronger at elevated temperatures. In the laboratory and on the road Satco has actually been run at temperatures of 400° F. with no effect on the bearing. That means high resistance to lint wipers and thread risers.

ULTIMATE COMPRESSIVE STRENGTH AT NORMAL AND ELEVATED TEMPERATURES



Ultimate compressive strength of Satco is higher at elevated temperatures but approximately same as other lining metals at starting temperatures. This assures high degree of conformability.

DYNAMIC LOAD FACTORS AND BEARING LIFE

R-S Journal Stops reduce dynamic load factors and Satco takes the toughest load you'll have. With Journal Stops the bearing always takes the load in the crown where it should, and Satco's extra strength at high temperatures assures added resistance to both wear and load. That means far longer bearing life—no spread linings, no cracked or shelled-out linings.

With Journal Stops you also get reduced and more uniform wheel flange wear, and the prospects are for reduced center pin wear and a lower mortality rate for coil springs. In fact, you cut truck maintenance costs all along the line—get big savings for a very small investment.

Of all the many developments designed to reduce hot boxes, R-S Journal Stops and Satco are the only ones which require no special maintenance or precautions and introduce no new problems to car servicing forces. They put the selection of any alternate type lubricator on a purely economic basis. Also you still have all the other advantages which low-cost solid bearings bring to railroad rolling stock. You can take the maximum load, and make the fastest schedule. Lading gets the smoothest ride. You save excess dead weight per car and get the lowest running resistance in pounds per ton. Best of all, you'll be sure of the kind of bearing performance you want at the lowest possible cost. Magnus Metal Corporation, 111 Broadway, New York 6; or 80 E. Jackson Blvd., Chicago 4.

MAGNUS

Solid Bearings

Subsidiary of **NATIONAL LEAD COMPANY**

A Car Wheel Takes

A BEATING!

Operating at fifty, sixty, seventy miles an hour, having constantly to withstand high-velocity shock and impact—all this in temperatures from thirty below zero to one hundred above and sometimes more, *a car wheel takes a beating!*

Attached to its axle by friction alone and having to operate under these conditions *or else*, and that "or else" meaning nothing less than disaster, the wheel-to-axle fit has to be right. *There is no alternative!*

Wheel bores have to be straight, round and concentric! There is no alternative to that either.

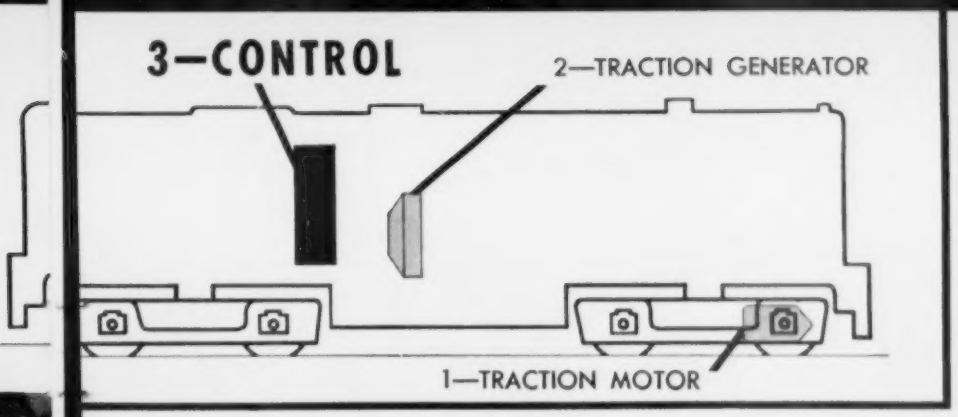
Wheel boring is not a tool room job where you can fiddle and fuss to get accuracy. There are too many wheels and not enough time. Wheel boring is a high-production job where you have to get straight, round, concentric bores in one pass of the roughing and finishing tools.

Betts Car Wheel Borers are designed and built to give you accurate bores and fast! They are top-quality, high production machine tools.

CONSOLIDATED MACHINE TOOLS F/B

CONSOLIDATED MACHINE TOOL CO.
ROCHESTER 10, N. Y.
A Division of Farrel-Birmingham Company, Inc.

3 REASONS WHY THE G-E TRACTION SYSTEM SETS THE INDUSTRY STANDARD



THREE SUPERIOR COMPONENTS, installed as an integrated system, help you get rugged, flexible motive power that assures better locomotive utilization and easier maintenance.

HOW G.E.'s CONTROL SYSTEM HELPS YOU GET BETTER PERFORMANCE FROM YOUR LOCOMOTIVE

RELIABILITY. One of the chief benefits any locomotive control system can provide is reliability between annual inspections. The important element is the reduction of small maintenance problems that only aggravate other maintenance problems and strain facilities. In actual railroad tests, locomotives equipped with G-E control have operated from annual inspection to annual inspection without a single detention being charged to the control system.

PERFORMANCE. General Electric control equipment utilizes full engine horsepower while giving accurate control of the locomotive's tractive effort. This results in smoother handling of long, heavy trains. Other benefits of G-E control include less wheel slip, less rail burn, easier and more positive train starting under poor rail conditions, and easier and better train handling under all conditions.

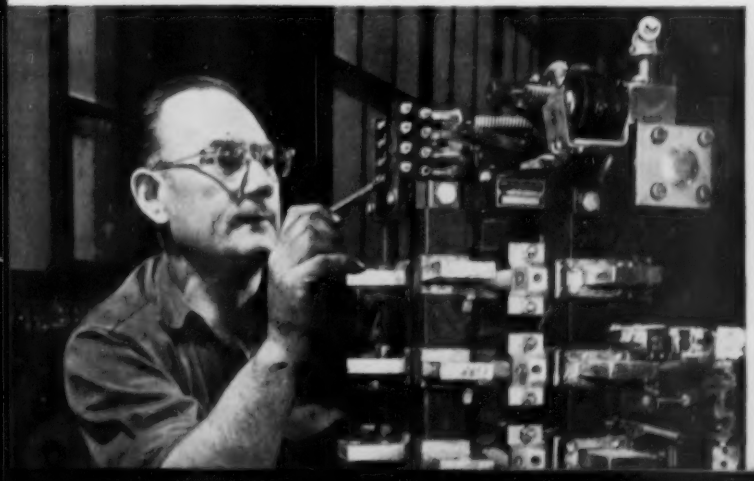
DYNAMIC BRAKING. G-E control allows the traction motor to deliver 30% higher dynamic braking effort than other equipment. Equally important is the fact that this braking effort is delivered over a wider usable speed range than other braking systems.

Ask your G-E Apparatus Sales representative for more information about G-E control—one of the superior components of the traction system that sets the industry standard. General Electric Company, Locomotive and Car Equipment Department, Erie, Pa. 115-7A

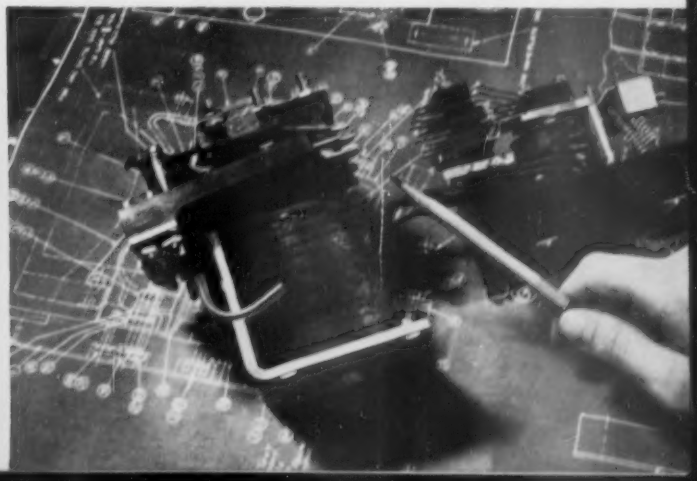
Progress Is Our Most Important Product

GENERAL ELECTRIC

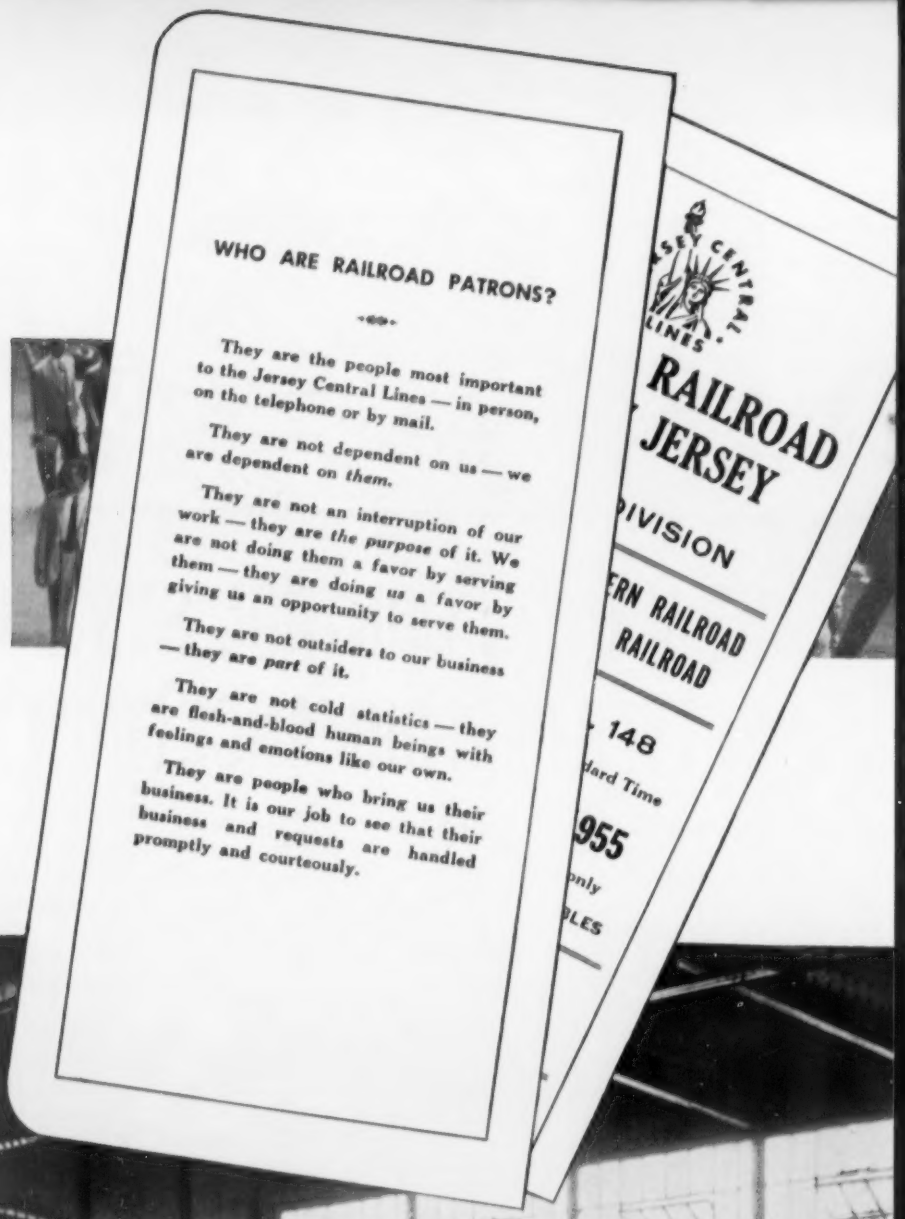
BUILT FOR MORE DEPENDABLE OPERATION. G-E control equipment is simple and rugged in construction. This means fewer working parts, less maintenance.



NEW HEAVY-DUTY LV-66 relay (left) has protected fingers, long-life silver contacts, and is more rugged and reliable than older type (right).



Who are Railroad Patrons?


WHO ARE RAILROAD PATRONS?
They are the people most important to the Jersey Central Lines — in person, on the telephone or by mail.
They are not dependent on us — we are dependent on *them*.
They are not an interruption of our work — they are *the purpose* of it. We are not doing them a favor by serving them — they are doing *us* a favor by giving us an opportunity to serve them.
They are not outsiders to our business — they are *part* of it.
They are not cold statistics — they are flesh-and-blood human beings with feelings and emotions like our own.
They are people who bring us their business. It is our job to see that their business and requests are handled promptly and courteously.
JERSEY CENTRAL LINES
RAILROAD
JERSEY
DIVISION
ERN RAILROAD
RAILROAD
148
dard Time
955
only
LES

"They are the people most important to the Jersey Central Lines..." They are the commuters who asked for better rush-hour service . . . less precious time spent between home and work.

The Answer—Longer Trains...Shorter Schedules. The Jersey Central promptly answered that request with a fleet of Fairbanks-Morse Train Masters, which had the power to cut time out of schedules . . . add cars to rush-hour trains.

Who are railroad patrons? May we, too, at Fairbanks-Morse say: "They are not outsiders to our business—they are a part of it."

TM

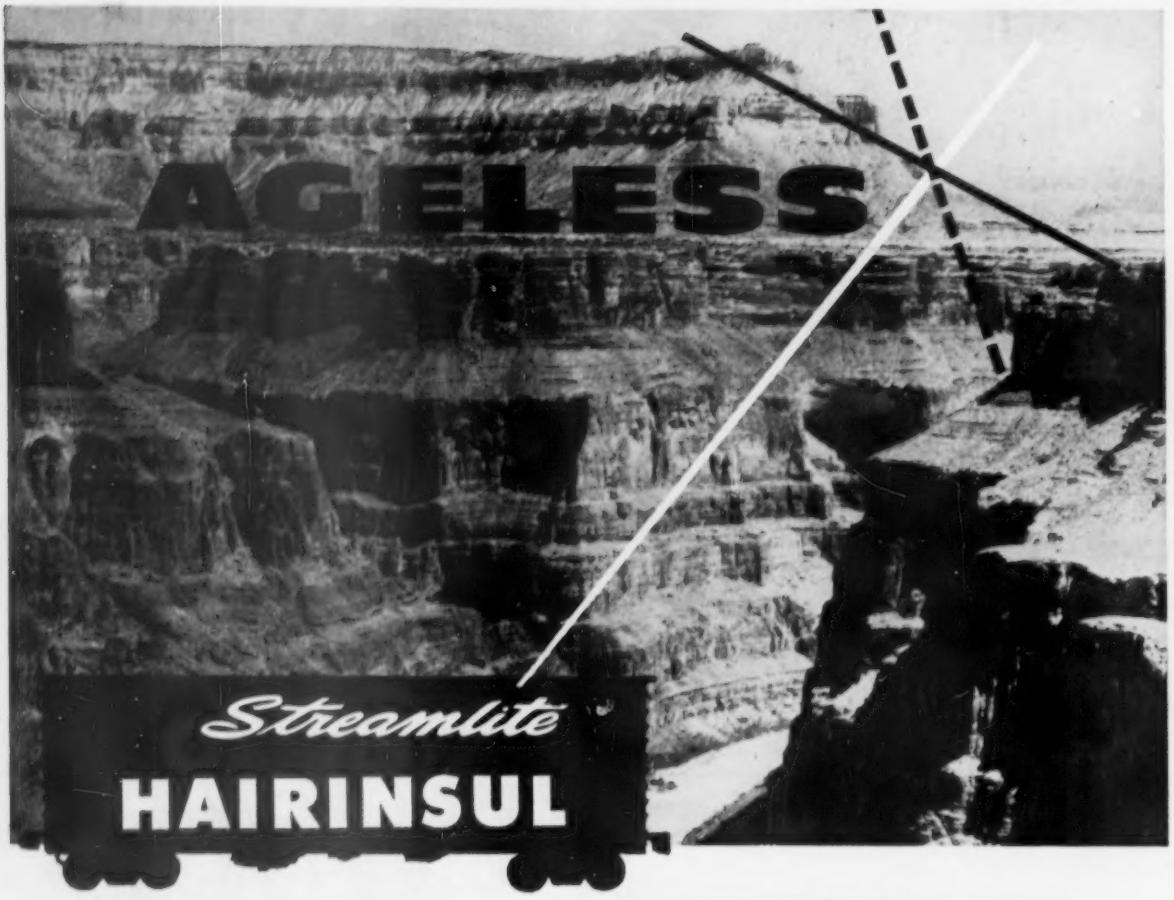
Your soundest motive power buy

Fairbanks, Morse & Co.,
600 South Michigan Avenue, Chicago 5, Ill.

FAIRBANKS-MORSE

a name worth remembering when you want the best

DIESEL LOCOMOTIVES AND ENGINES • RAIL CARS AND RAILROAD EQUIPMENT • ELECTRICAL MACHINERY • PUMPS • SCALES • WATER SERVICE EQUIPMENT • MAGNETOS



LOW CONDUCTIVITY . . . Thoroughly washed and sterilized, all-hair heat barrier. Rated conductivity —.25 btu per square foot, per hour, per degree F., per inch thick.

LIGHT WEIGHT . . . Advanced processing methods reduce weight of STREAMLITE HAIRINSUL by 40%.

PERMANENT . . . Does not disintegrate when wet, resists absorption. Will not shake down, is fire-resistant and odorless.

EASY TO INSTALL . . . Blankets may be applied to car wall in one piece, from sill to plate and from one side door to the other. Self-supporting in wall sections between fasteners.

COMPLETE RANGE . . . STREAMLITE HAIRINSUL is available ½" to 4" thick, up to 127" wide. Stitched on 5" or 10" centers between two layers of reinforced asphalt laminated paper. Other weights and facings available.

HIGH SALVAGE VALUE . . . The all-hair content does not deteriorate with age; therefore has high salvage value. No other type of insulation offers a comparable saving.

OUTLASTS THE LIFE OF THE CAR

That bright new refrigerator car coming out of the shop will someday wear out, be sold for scrap or be junked, but the STREAMLITE HAIRINSUL originally used in the car can be salvaged to be used again. It actually outlasts the life of the car!

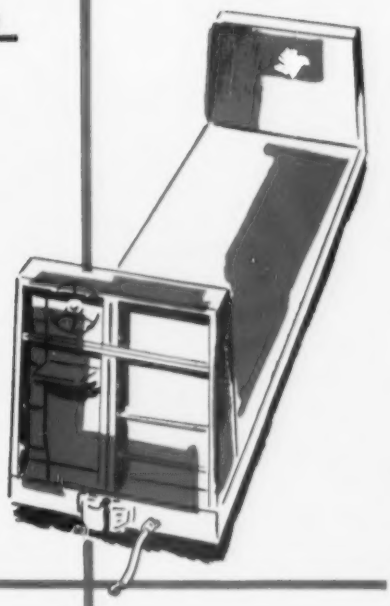
STREAMLITE HAIRINSUL's high insulating efficiency remains the same year in and year out. Records show where all-hair insulation removed from refrigerator cars after 20 years or more of service, is in like new condition. All-hair insulation does not deteriorate with age. Its salvage value is high.

At left are additional reasons why STREAMLITE HAIRINSUL is the leading car insulation. Write for complete data.

MERCHANDISE MART, CHICAGO 54

SETS THE STANDARD BY WHICH ALL OTHER REFRIGERATOR CAR INSULATIONS ARE JUDGED

INTERNATIONAL STEEL'S



Permanent Bulkhead Flat Car

INTERNATIONAL STEEL
SPECIAL PURPOSE CARS
cost less to build than to rebuild an old car!

This is a precision-built gondola—53'6" long and of 70-ton capacity. It will last longer because it has the International all-welded underframe and superstructure.

No obsolete design in this freight car—with the All-Purpose Bulk-Lading door. Precision, welded construction eliminates corrosion and infestation harbors. There's a grain loading and inspection door in the side door—Purposeful design!

Corrective design makes this refrigerator car impervious to corrosion in pockets where moisture or infestation can gather.

Precision construction and corrective design make the International all-welded underframe a "perfect back-bone" for piggybacks as well as all freight cars.

Here is an International "Special Purpose Car" that turned out to be a *general* purpose car!

The special A.A.R. Committee on Forest Products Loading discovered that: *". . . the permanent bulkhead flat car offers big opportunities to both the lumber and the railroad industries."*

We knew this car required considerably less securement—we knew it saved time in adjusting shifted loads and in car shopping. We also knew, as the Committee reported, that *"One man with a fork lift truck could load or unload an entire car in a little over an hour!"*

But we *didn't* realize—as the Committee pointed out—that, because it *can handle 95% of ALL flat car lading*, it *". . . offers the railroads an opportunity to build freight traffic . . . cuts loading and unloading costs by as much as 75%!"*

INTERNATIONAL STEEL anticipates the requirements of the **railroads and shippers** through **aggressive, functional design.** *LOOK FOR EXCITING* **NEW** *NEWS IN FREIGHT CAR DESIGN . . . A NEW CONCEPT IN SHIPPING AND STOWAGE . . . this fall . . . from International!*

INTERNATIONAL STEEL COMPANY
EVANSVILLE 7, INDIANA
RAILWAY DIVISION

In one door a 7-year-old F3 that has delivered over a million miles of heavy-duty freight service.

Out the other a completely remanufactured locomotive that carries the performance rating of a new General Motors F9—*and is backed by the same warranty as a brand-new unit.*

That, in short, is the story of Electro-Motive's program for rebuilding and modernizing work-weary Diesels.

Utilizing the world's most modern locomotive manufacturing facilities, Electro-Motive brings old units up to the latest standards —*higher horsepower, greater tractive effort and reduced maintenance*—with a substantial return on investment!

For further information on Electro-Motive upgrading of old locomotives—write us or phone your nearest Electro-Motive representative.

ELECTRO-MOTIVE DIVISION · GENERAL MOTORS

La Grange, Illinois • Home of the Diesel Locomotive

GENERAL MOTORS LOCOMOTIVES

Highlights of F3 to F9 Locomotive Upgrading

UP TO 17% MORE POWER available for propulsion—hauls more tons as fast or the same tonnage faster. Longer engine life, reduced maintenance with new "C" crankcase.

LONGER LIFE TRACTION MOTORS—new moistureproof coils—short-time ratings eliminated.

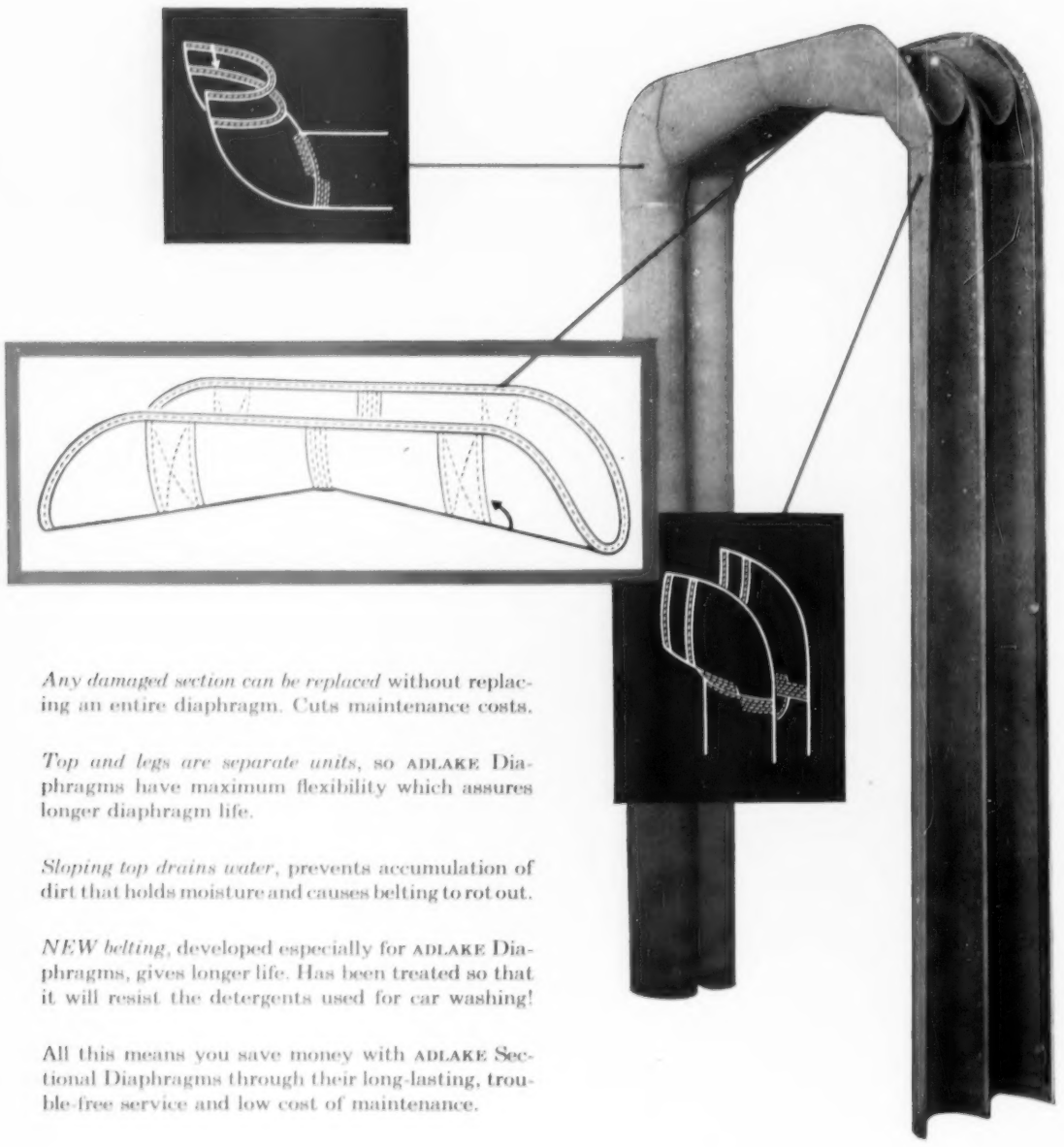
NEW ELECTRICAL CONTROLS—maintenance-free between six-year overhaul periods.

NEW SEALED GEAR CASE with stable lubricant—up to ten times previous performance.

NEW BRAKE RIGGING STABILIZER—insures better alignment of brake shoes for longer life plus greater safety.

9 regional warehouses and factory branches to serve you

sectional! That's the secret of Adlake diaphragm savings



Any damaged section can be replaced without replacing an entire diaphragm. Cuts maintenance costs.

Top and legs are separate units, so ADLAKE Diaphragms have maximum flexibility which assures longer diaphragm life.

Sloping top drains water, prevents accumulation of dirt that holds moisture and causes belting to rot out.

NEW belting, developed especially for ADLAKE Diaphragms, gives longer life. Has been treated so that it will resist the detergents used for car washing!

All this means you save money with ADLAKE Sectional Diaphragms through their long-lasting, trouble-free service and low cost of maintenance.

Adlake 98th year of serving the transportation, building and general industries

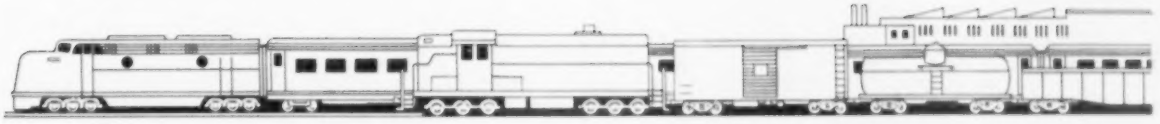
THE Adams & Westlake COMPANY

New York • ELKHART, INDIANA • Chicago

Established 1857

Manufacturers of ADLAKE Specialities and Equipment for the Railroad Industry

?????



TWO NEW PROBLEMS have come to us this month. If your experience or ideas can help with these topics, remember it pays to submit them to Q&A Editor, Locomotive & Cars.

- *Can diesel locomotive interiors be water-proofed so they can be spray cleaned without damaging the electrical equipment?*
- *For ordinary car repair operations, are there ways to speed and mechanize the application of wooden box car lining?*

JOURNAL LUBRICATORS

Have any special tools been developed for installing the newly-developed journal lubricating devices, can the regular packing hook be of any use, or is this strictly a hand operation?

INSPECT THEM—THEN, HANDS OFF, *by W. L. Magee, Jr., coach foreman, Houston Belt & Terminal, Houston, Tex.* The best tool an oiler can have when inspecting the new lubricating devices is a good hand lantern. He should confine his inspection to looking inside the journal box for defective rollers, springs, pads and retainers. Any attempt to use the regular packing hook will probably result in damaging springs or arms on the rollers, or in tearing the special packing or pads. Any rearrangement of the parts on these lubricators should be done by hand. This should be done only when necessary. At other times a strict "Hands Off" policy should be followed.

The car oiler should keep in mind that these devices work best when the proper oil level is maintained. He should inform himself of the correct oil level for all these various lubricating devices, and should then fill each box to the proper level with good clean AAR car oil.

●

LOCOMOTIVE REWIRING

During the rebuilding of older diesel units, is the most economical solution complete rewiring? When it is used, is this the thing that keeps the unit in the shop the longest, and if it is, how can this time be reduced?

REWIRING CAN BE SCHEDULED, *by W. H. Mims, superintendent motive power and equipment, Central of Georgia, Savannah, Ga.* Nearly every railroad supervisor is convinced that complete rewiring is desirable on older units. Exactly how and when it is to be done is a problem that must be worked out individually by each road to satisfy its own particular demands.

On a road such as ours, with a motive power fleet that includes small groups of different models from all four builders, we cannot take advantage of production line programming of rewiring. Further, we do not normally unit exchange engines, generators and trucks at heavy repairs because of the large investment in extra equipment this would require. As a result, units placed in the shop for heavy repairs are held while the engine and other major components are rebuilt.

Under these conditions, we do not find that rewiring delays outshopping. Most of the wiring can be completed during the time the engine is being rebuilt, although in every case of locomotive repair, some work cannot be completed until the other crafts have finished their portion of the work. Since this is true whether the locomotive is rewired or is simply stripped for repairs, it cannot be blamed on the rewiring.

Engine rebuilds do not always correspond to rewiring requirements so we frequently take advantage of short out-of-service periods to perform partial or "progressive" rewiring. Since locomotives are invariably available during monthly and annual inspections, wheel changes and other running repair work, we take advantage of this out-of-service time to renew as many circuits as possible. In this manner, unit can be slowly and systematically rewired with no loss of availability.

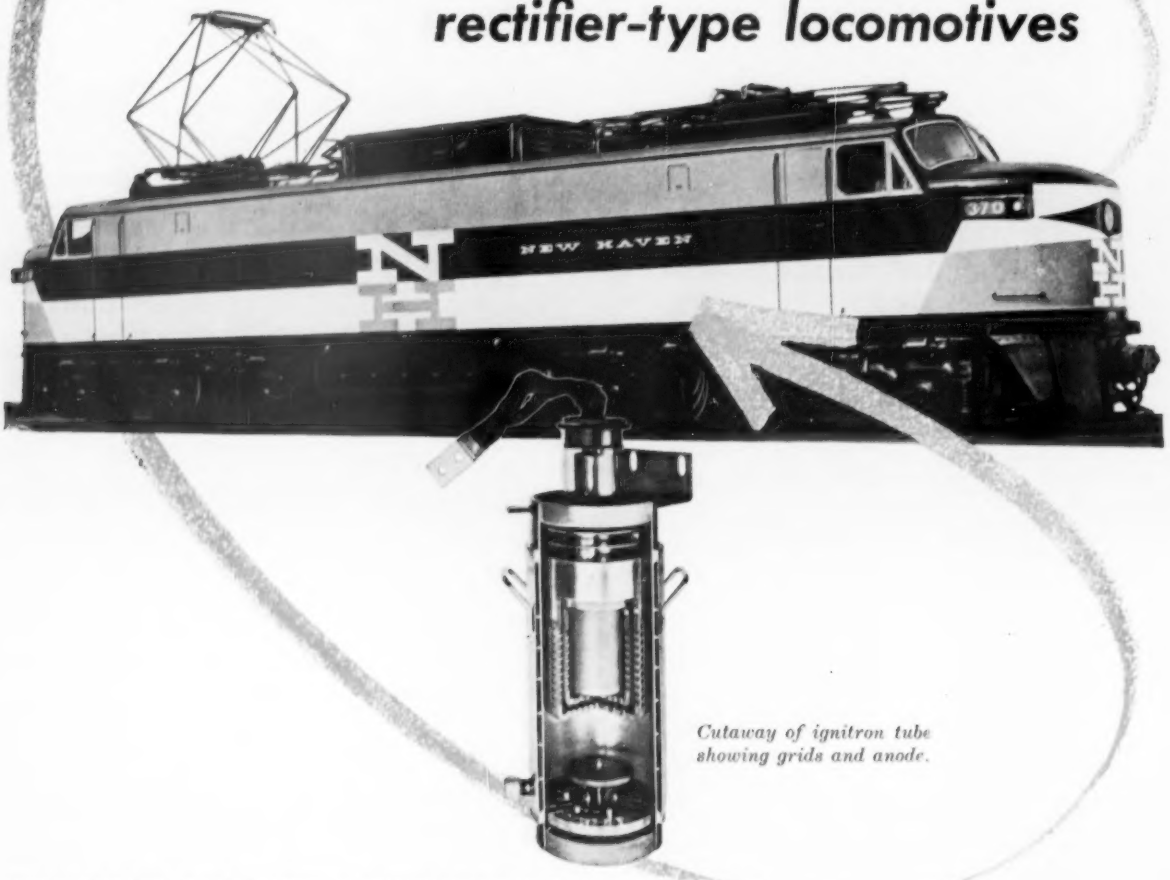
Successful rewiring demands specialists. Whenever possible, it pays to train a rewiring crew, and to use this force consistently on rewiring. Unless this is done, labor costs will be excessive and locomotive delays because of incorrect connections will be frequent.

FIRST, HOW IS THE WIRING? *by L. E. Legg, electrical engineer—equipment, Chicago & North Western.* We have found that the general condition of the wire insulation can be determined by history, observation and by megger readings. When we are anticipating the shopping of a certain locomotive, we go through the history of the unit's operation to determine whether or not wire insulation has caused any trouble or road failures. If there have been none, it is assumed that the wiring is not in an extremely poor condition.

After the locomotive is tied up for heavy work, a very careful examination is made. The condition of the eyelets and lugs is checked, and the flexibility of the insulation is determined. Even though the insulation may be found to be hard and set, it may not be replaced except at locations where it must flex during operation. Finally, a megger test is made. If there is a reading of over one megohm, the wiring is not replaced. The C&NW has several locomotives which have their original wiring after

(Continued on page 88)

Speer carboneered IGNITRONS power New Haven's ten new rectifier-type locomotives



Cutaway of ignitron tube showing grids and anode.

Twelve G-E double-grid ignitron rectifier tubes supply d-c power to the New Haven Railroad's new 4000-horsepower locomotives. Each tube contains a Speer graphite shield grid, control grid, and anode. These parts are made of the finest grade graphite—free of impurities that cause arc-back and flash-over.

Precision-machined shield and control grids are designed to operate at voltages up to 500 volts—the anodes at voltages up to 4000 volts. Speer graphite electrodes withstand high overloads without melting. In addition, their coefficient of expansion is so small that there is no warp or distortion.

Applications of carbon products throughout industry are virtually limitless. Speer *Carboneering* has contributed vastly in fulfilling unusual design and material requirements. Let our experienced designers and engineers help you *Carboneer* a practical solution to your parts problem.

You be the judge of carbon's versatility

Carbon can be:	Carbon has:
Sawed	High corrosion resistance
Drilled	High heat transfer
Milled	Low electrical resistance
Broached	High thermal shock resistance
Turned	
Planed	**Carbon is:**
Hobbed	Not wetted by molten metals
Ground	Non-warping
Molded	Chemically inert
Extruded	Self-lubricating

SPEER Carbon Co.
St. Marys, Pennsylvania

THE ENGINEER'S REPORT

DATA

LUBRICANT RPM Delo Oil R.R.

UNIT Diesel locomotive

SERVICE Mountain freight haul

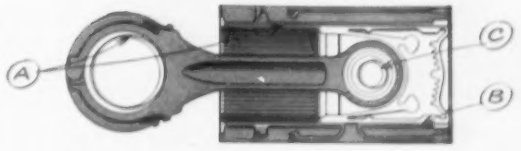
CONDITIONS Long, continuous grades to 1.6%

FIRM The Milwaukee Road

333,590 freight miles—only 0.0035 inch liner wear!

LUBRICATED WITH RPM DELO OIL R.R., this representative cylinder assembly was in good condition when pulled for regular inspection after 333,590 actual freight miles. Operation was on The Milwaukee Road's tough run between Othello, Washington, and Avery, Idaho. This liner, shown as it came from the engine, miked only 0.0035 inch wear, 0.001 inch taper, despite hard operating conditions—heavy loads, wide temperature variations, heavy grades, including one stretch of 20 miles of continuous 1.6 percent. Neither wristpin or bushing showed measurable wear.

How RPM DELO Oil R.R. prevents wear, corrosion, oxidation



A. Special additive provides metal-adhesion qualities...keeps oil on parts whether hot or cold, running or idle.

B. Anti-oxidant resists deterioration of oil and formation of lacquer... prevents ring-sticking. Detergent keeps parts clean...helps prevent scuffing of cylinder walls.

C. Special compounds stop corrosion of any bushing or bearing metals and foaming in crankcase.

FREE CATALOG: "How to Save Money on Equipment Operation," a booklet full of valuable information, will be sent you on request to Standard Oil Company of California, 225 Bush St., San Francisco, Calif.

RPM DELO LUBRICATING OILS

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor handling them, write or call any of the companies listed below.

TRADEMARKS "RPM DELO" REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Barber, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

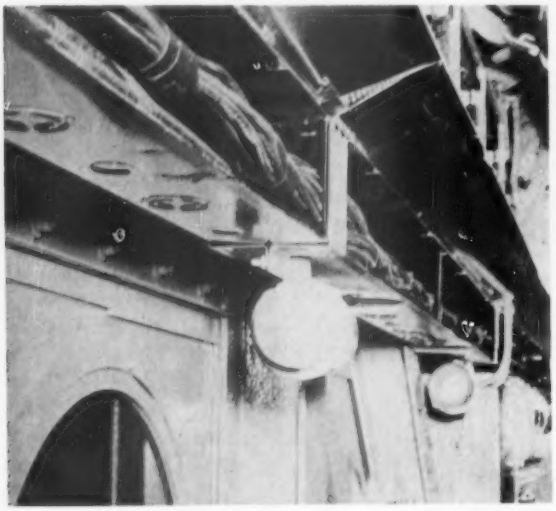
(*Continued from page 85*)

16 years of service. Often only portions of the wiring system are replaced. Up to the present time, only about ten units have been completely rewired.

After many years of experience in diesel-electric wiring, we feel that the type of insulation which is applied by the "strip process" gives us the best service. This type of wiring has a high dielectric next to the conductor. Defective conductors never are the cause of wiring replacements. It has always been weakened insulation, and because of the high labor cost in rewiring, the best insulation available is the most economical.

At the present time we do not feel that complete rewiring is the most economical solution. Only in extreme cases, such as when fire damage is involved, is it necessary to completely rewire a locomotive. In the future we must expect to completely rewire locomotives on a periodic basis because we know that insulation will not last forever.

One factor which has greatly increased the cost of rewiring on some locomotives has been the small con-



Wire ducts have replaced conduits on some locomotives.

duits originally installed. It may not even be possible to pull out the old wire, and new conduit must be installed. Recent thinking has led to the use of wire ducts to minimize shopping time. If they are used, they must be laid out so that there are no low points or pockets to collect moisture.

WITH CARBODY REBUILDS—NOT ENGINE REPAIRS, *by C. W. Martin, assistant engineer—diesel electric, Baltimore & Ohio, Baltimore.* The term "rebuilding" should be qualified to indicate that the complete unit is being upgraded and not just the power plant. Too many maintenance personnel call heavy repair to the diesel engine "rebuilding". This term is used very loosely.

Complete rewiring of a diesel unit should be done whenever the wiring has deteriorated because of accident or age. Whenever some of the wires in cabinets, conduit or wire ducts must be renewed, an overall job must be considered. It has been our feeling that all the wires of the same age and with the same insulation covering should be replaced at the same time. Then after such repair, the wiring of the unit should be serviceable until the unit receives its next heavy carbody repair.

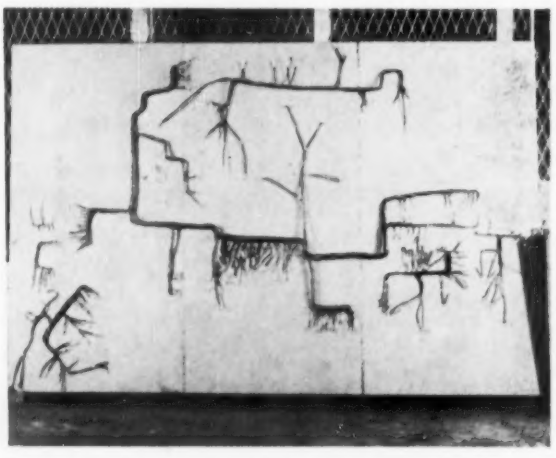
With the old varnish cambric insulation, some of us replaced control wiring without replacing the power wiring. We shortly learned that the power wiring would not give any longer service than the control wiring, and the unit had to be reshopped for this work. Had it all been changed at the same time, considerable expense would have been avoided.

It is our feeling that all wiring should have the same expected service at any time. Rewiring should be scheduled with heavy carbody repairs. There should be a minimum of wiring changes or renewals during the periods between complete rewiring jobs.

NOT DURING CLASS REPAIRS! *by E. H. Schoedinger, Master Mechanic, Florida East Coast, Miami, Fla.* I am sure that those railroads that have gone through the first cycle of a rewiring program will all agree that the second rewiring cycle is much easier. There are several reasons for this. Preliminaries such as the type and quantity of material to be ordered have been established. The experience of the men gained during the first job is now available. Improved materials frequently become available to speed the operations. As an example, the insulated wire we now use has twice the life of that formerly employed.

When the first rewiring job was scheduled on our railroad, from 200 to 210 working hours were required to do the job. Now with the modern tools for crimping lugs, and using previously prepared harnesses for the high and low voltage cabinet wiring, this time has been greatly reduced. Another aid has been the use of low voltage panels adjusted with instruments on the bench and ready for service when applied.

In my opinion, the scheduling of rewiring can be done at any time, and it is preferable to do the work when the unit is not undergoing class repairs that call for diesel engine work. When there is no engine work going on, the interference and confusion among men of the different crafts is eliminated. To do only a rewiring job allows the mechanics to perform their work in minimum time and shortens the time that the unit is out of service.



Harness permits advance assembly of locomotive wiring.

Announcing . .

New **ARMORTEX**

AMAZING SPRAY-ON, BRUSH-ON PLASTIC COATING THAT *PERMANENTLY* UPGRADES ANY BOX CAR INTERIOR TO MEET HIGH TARIFF LADING REQUIREMENTS!!

Here's really big news the whole railroad industry has been waiting for! Now, for the first time, it is possible to apply a quick, economical protective coating to box car floors and walls which insures the *permanent*, superior surface needed for shipment of high grade bulk commodities such as grits, flour, sugar and grain.

Armortex, an amazing new discovery of the J. W. Mortell Railroad Division, completely eliminates the costly preparation of cars for individual loadings. Internal car surfaces coated with Armortex no longer splinter or deteriorate under normal operating conditions...thus resulting in a reduction of claims due to leakage, infestations, package damage.

Still another big advantage of new Armortex is its ease of application. One man can cover a box car floor in less than 30 minutes...readying the car for service the next day. By spraying, brushing or troweling, Armortex can be applied at any shop, rip-track or siding without returning the car to a central maintenance location.

GIVE LASTING 6-WAY PROTECTION TO BOX CAR INTERIORS, OLD OR NEW!

- **SMOOTH, TOUGH SURFACE**—EASILY SWEPT OUT
- **ADHERENT**—a mastic which bonds to surface. Not a strippable material.
- **FLEXIBLE**—tough, but not brittle. ⅛" film will bend around 1" mandrel.
- **SOLVENT RESISTANT**—unaffected by mineral spirits, water or gasoline. Wood color of film will not stain or discolor.
- **NON-HAZARDOUS**—an oil-in-water emulsion. Presents no fire hazard in storage or application.
- **INSECT RESISTANT**—made of synthetic resin and mineral fillers—absolutely impervious to insects.

Write today for free illustrated booklet giving full details on ARMORTEX

JW Mortell COMPANY

Serving American Railroads Since 1895

J. W. Mortell Company
550 N. Hobbie Ave.
Kankakee, Illinois
Please send me FREE copy of Bulletin Q-55

Name_____

Company_____ Position_____

Address_____

City_____ State_____

THE BEST VESTIBULE CURTAIN . . .

morton

To Meet Your Needs:

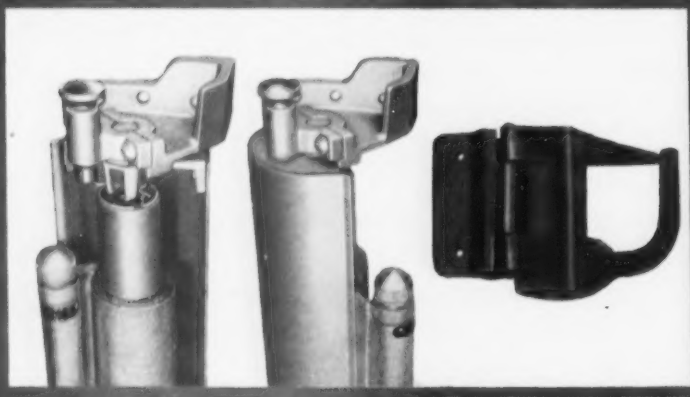
Adjustable or Non-Adjustable

Grooved or Plain

With or Without Snap-Button Holes

- toughest spring steel rollers
- cold-rolled welded steel tubing
- snap-button damage protection for premature pull-a-parts
- material and accessories to specification

CURTAINS, PARTS, HANDLES, HOOKS and BRACKETS for ALL REQUIREMENTS



Revolving shield and casing (shield open)

Revolving shield and casing (shield closed)

The new "B-J" vestibule curtain release handle. Positive releasing feature . . . service-proven.

morton

MANUFACTURING COMPANY

5125 West Lake Street, Chicago 44, Illinois

SUPPLY TRADE NOTES

(Continued from page 23)

izing them; and lease of the rebuilt units to carriers on a per diem basis.

Ben Colman, a vice-president of Evans, has been elected president of the new company, and will direct its operation from his Plymouth, Mich., office. General office of Greenville-Evans will be in Pittsburgh.

■

Emil P. Kondra

NATIONAL BRAKE COMPANY.—*E. P. Kondra*, assistant vice-president at New York, has been appointed vice-president, sales.

■

KOPPERS COMPANY.—*R. H. Devine*, assistant sales manager, Wood Preserving division, Pittsburgh, has been appointed assistant manager, eastern district, at Wilmington, Del., and has been succeeded by *J. W. Sullivan*, manager of the Colorado district.

■

SMOOTH-ON MANUFACTURING COMPANY.—*George T. Morse*, formerly with U. S. Gypsum Company, has been appointed vice-president and director of sales for Smooth-on, Jersey City, N. J. Mr. Morse will be concerned primarily with sales development of Smooth-on's new epoxy resin casting and repair compounds.

■

SCULLIN STEEL COMPANY.—*Paul F. Gutmann, Jr.*, assistant chief mechanical engineer, has been appointed chief mechanical engineer.

■

T-Z RAILWAY EQUIPMENT COMPANY.—*Roland E. Olson* has been named representative at Minneapolis.

■

STRAN-STEEL CORPORATION. — The Steel Floor and Stran-Steel Divisions of the Great Lakes Steel Corporation, a subsidiary of the National Steel Corporation, have been established as a separate division of National, to be known as the Stran-Steel Corporation, *Charles LeB. Homer* is president of Stran-Steel. *William A. Baldwin*, formerly Chicago sales representative for the Steel Floor Division, is in charge of national sales. *H. B. Hoesly*, formerly me-

(Continued on page 98)

You'll cut handling costs with ROEBLING ALL-PURPOSE SLINGS

THESE are the easiest-to-handle slings ever put on the market. There are no servings—no bulky sections of rope next to the loop. All wire ends are safely and permanently covered by the tapered sleeve. And on top of that, these slings are remarkably flexible, *doubly* safe, and real time-savers on the big majority of lifting jobs.

Roebling All-Purpose Slings come to you ready for work. They cost less than most other slings and they're a cinch to order. They have the full catalog strength of the "Blue Center" steel wire rope with I.W.R.C. from which they're made, assuring maximum sling service life.

Roebling All-Purpose Slings are stocked in standard sizes and lengths for immediate delivery. Order them from your jobber—and write us for descriptive folder. John A. Roebling's Sons Corporation, Trenton 2, N. J.

You can have these slings with a tapered sleeve attachment with a heavy steel galvanized thimble plus the following attached fittings:

Drop Forged Steel Weldless Hook

Drop Forged Weldless Shackle

Weldless Link

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HGTS. BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, NEW JERSEY

Questions and Answers

General Motors
Diesel-Electric Locomotives

This is a new series of Questions and Answers pertaining to General Motors diesel-electric locomotives. The references to manual and page numbers in the text indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.

G335-Q—What happens when the ground relay is tripped?
A—When tripped, the ground relay opens the shunt and battery field contactors, unloading the main generator.

G336-Q—What must be done before the unit can again deliver power?
A—The ground relay must be reset by pressing in on the reset button on the relay.

G337-Q—What should be done in case the ground relay trips repeatedly?
A—In this event the power plant must be isolated.

G338-Q—What precaution must be taken before resetting the relay?
A—Always isolate the unit before resetting the ground relay.

G339-Q—What is the visual indication of ground relay tripping?
A—The white needle in the relay will point to a red dot.

G340-Q—What is the normal indication?
A—In normal position the needle points to a yellow dot.

G-341-Q—What is the engine speed after the ground relay trips?
A—The speed of the engine will be reduced to Idle and will remain at that speed unless the throttle is placed in the 5th or 6th notch, in which case the engine will stop.

G342-Q—What other reason besides a high voltage ground may be assigned for tripping of the ground relay?
A—Although a high voltage ground will normally be the only reason for ground relay tripping, a low-voltage ground can trip the relay when the engine is started; at that time the high and low voltage systems are temporarily connected.

G343-Q—Is ground relay action an idication of serious trouble?
A—Not necessarily, but it should be reported.

G344-Q—When the ground relay knife switch is opened, what is the result?
A—When open, this switch eliminates the protection of the ground relay.

G345-Q—What precaution should be taken in connection with this switch?
A—This switch must not be opened in normal operation unless definite instructions are issued by an official of the railroad.

No A-C Voltage Relay (NVR)

G346-Q—How may failure of the alternator result in damage to the traction motors?
A—As the traction motors are cooled by A-C driven blowers, a failure of the alternator could result in damage to the traction motors unless the application of power was stopped.

G347-Q—How does the NVR react to an alternator failure?
A—In case of an alternator failure, the No A-C Voltage Relay, located on the low voltage panel, drops out and causes the alarm bell to ring in all units.

G348-Q—What else takes place?
A—It also turns on a blue light and reduces the engine speed to idle in the unit affected. If the throttle was in the 5th or 6th notch, the engine would stop.

G349-Q—Is an alternator failure usually the cause of an engine stopping?
A—An alternator failure is usually only the result of an engine being stopped and not the cause.

(Manual 2310, page 317)

G350-Q—When will the alternator failure alarm not operate?
A—When isolation switch is in START position.

Dynamic Braking

G351-Q—What changes are made when the locomotive is changed from power operation to dynamic brake?
A—Three changes: (1) The armatures of traction motors are connected to grids located on the top of the carbody; (2) In each unit all four traction motor fields are connected in series with the main generator; (3) The field loop circuit is established.

G352-Q—What is the field loop circuit?
A—This is a circuit connecting the battery fields of each unit in series with the low voltage source in the lead unit.

G353-Q—Describe the action up to and including the connection of traction motor armatures to the grids.
A—By moving the transition lever from the No. 1 to the "OFF" position, a contact in the controller energized the "B" wire throughout the locomotive. In each unit taps from this wire energize the cam switch TOW magnet valve; this moves each cam switch to the TOW position, disconnecting the traction motor armatures from their fields and connecting them to their respective grids.

G354-Q—What other action is brought about as a result of the movement of the cam switch to TOW position?
A—Cam-switch interlock EF is closed which causes the braking contactors (B) to close in each unit, connecting the traction motor fields in series with the main generator.

G355-Q—What other action took place as the transition lever was moved to OFF position?
A—It also energized the field loop contactor (FL) in the lead unit. This contactor connects the brake control (transition lever) to the field loop circuit and partially completes the field loop.

(Turn to page 96)

the hand that writes the specifications

has a few words for the man who consigns the lading

Real cooperation! It's just that when a mechanical man writes "Barber Stabilized Trucks" into his new freight car specifications. The shipper gains a cushioned ride for his lading. The railroad prolongs the life of its cars, protects costly road beds, builds satisfied customers and cuts damage claims. Everybody *saves!*

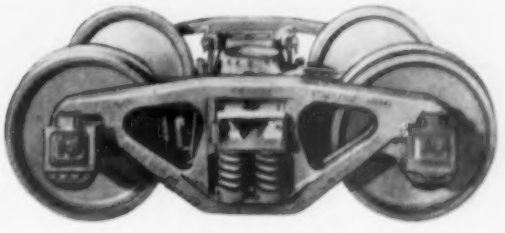
Simplest, smoothest principle you ever saw. The Barber Stabilized Truck has the fewest possible parts, and they are sturdy. When many years of good performance and normal, necessary friction wear makes it advisable to change the friction shoes, Stabilizer parts can be removed for replacement very quickly. No bars nor prying needed; no costly labor items. Standard Car Truck Co., 332 S. Michigan Avenue, Chicago 4, Illinois. *In Canada:* Consolidated Equipment Company, Ltd., Dominion Square Building, Montreal 2.

5 BILLION MILES PER YEAR
of smooth, trouble-free service provided by . . .

350,000 CAR SETS
of Barber Stabilized Trucks now in operation with . . .

OVER 100 MAJOR RAILROADS
and private car lines.

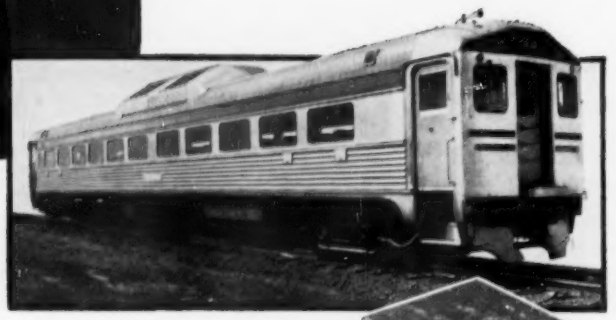
Specify BARBER
STABILIZED TRUCKS



Selected for maximum wear with minimum care

Johns-Manville TERRAFLEX Vinyl Floor Tile

. . . in Budd Company R.D.C. all-stainless steel passenger cars



Heavy traffic in this Budd Company R.D.C. diesel-powered passenger car has little effect on the durable J-M Terraflex floor. A damp-mopping whenever necessary, will restore it to its first-day color beauty.

J-M Terraflex® needs less care and gives more wear than any other type of resilient floor of equal thickness . . . pays for itself through years of low-cost maintenance

As a result of its tested performance in railroad car installations, Johns-Manville Terraflex Vinyl Floor Tile is standard equipment in the Budd Company's new R.D.C. passenger cars.

J-M Terraflex is a flooring of time-proved superiority. Made of vinyl and asbestos it is exceptionally tough and resistant to traffic . . . defies grease, oil, strong soaps and mild acids.

Terraflex saves time and dollars through low-cost maintenance. Its nonporous surface requires no hard scrubbing . . . damp-mopping keeps it clean and bright . . . frequent waxing is eliminated. Through years of economical service Terraflex pays for itself.

Terraflex is available in a wide range of pleasing colors that will bring beauty as well as utility to floors in cars and buildings.

For the full Terraflex story . . . and its advantages for railroad service, get in touch with your Johns-Manville Representative or write for book FL 73A "Designs for Better Floors." Address Johns-Manville, Box 60, New York 16, N.Y.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville

97 YEARS OF SERVICE TO TRANSPORTATION

3 years to go...

WHEN JOURNALS ARE PACKED FOR *PROVEN* HOT-BOX PREVENTION

(A.A.R. approves, on request, 36 months repack period, where PLYPAK waste retainers are applied)

FROM AN OFFICIAL RAILROAD REPORT

"Upon completion of this 36 months test, the PLYPAKS, bearings, wedges and journals were in excellent condition."

Prevent hot-boxes...save money with PLYPAK. Your inquiry invited.

PLYPAK

WASTE CONTAINER AND RETAINER

WAUGH EQUIPMENT COMPANY, New York · Chicago · St. Louis · Canadian Waugh Equipment Company, Montreal

Fairbanks-Morse
Diesel-Electric Locomotives

This series of Questions and Answers pertains to Fairbanks-Morse diesel-electric locomotives. The references to manual and page numbers indicate where the original material may be found in the builder's technical publications or instruction manuals. These are usually available to authorized employees on each railroad.

F319-Q—What is the purpose of the Brake Warning Relay?
A—It is a voltage relay connected across one set of braking resistor grids to indicate when current is excessive.

F320-Q—What is the function of the Traction Motor Field Shunting Relay Backward Sequence?
A—Opens shunting contactors two at a time.

F321-Q—How does the Current Relay function?
A—This relay is energized by main generator current to operate backward shunting sequence. When open, it de-energizes traction motor field shunting relay.

F322-Q—What is the setting of the current relay?
A—2400 hp units—1900 amperes. Other units—1750 amperes.

F323-Q—What is the purpose of the Magnet Valves, Contacts and Interlocks on the cam switch?
A—Changes main power and control circuits from motoring to dynamic braking and vice-versa.

F324-Q—What is the purpose of the Cam-Switch Pressure Switch?
A—This is an air pressure switch to prevent cam-switch from throwing to "Motoring" unless there is ample control air pressure (used only on units equipped for dynamic braking).

F325-Q—What is the setting of the Cam-Switch Pressure Switch?
A—55 pounds.

F326-Q—What is the function of the Air Compressor Synchronizing Magnet Valve?
A—When energized by air compressor governor switch, it operates unloader to load the air compressor. It also energizes train line wire to load all compressors simultaneously.

F327-Q—How does the Air Compressor Governor Switch function?
A—Energizes the air compressor synchronizing magnet valve.

F328-Q—What are the closing and opening pressures?
A—Closed by main reservoir air pressure at 130 psi; Open at 140 psi.

F329-Q—How does the Dynamic Brake Interlock function?
A—Releases or prevents an automatic service (not emergency), or electro-pneumatic straight air application on the locomotive, while the dynamic brake is in operation.

F330-Q—How does the Dynamic Brake Nullifying Switch operate?
A—Operates to nullify dynamic brake in event of brake-valve-initiated emergency but not on a train-initiated emergency application.

F331-Q—What kind of a switch is this?
A—A pressure switch on air brake equipment rack.

F332-Q—How does the Dynamic Brake Nullifying Relay function?
A—Nullifies dynamic brake when energized by the dynamic brake nullifying switch.

F333-Q—How can it be reset?
A—Selector handle must be returned to "OFF" to reset.

F334-Q—What is the purpose of the Exciter Field Contactor?
A—Energizes battery (4 pole) field controlling exciter and hence main generator output.

F335-Q—When does this contactor close when motoring?
A—When throttle is in Notch No. 1 or above.

F336-Q—When does it close when dynamic braking?
A—Closes with throttle selector in "BRAKE".

(Bulletin 1706, 132A, Page 6)

F337-Q—What is the function of the Exciter Field Reduced Contactor?
A—Inserts 40 ohm resistance in exciter field when de-energized by either wheel slip relay. Also energizes governor ORS to send load regulator to minimum field.

F338-Q—How is the Engine Temperature Switch (ETS) connected?
A—Connected to thermo-bulb in engine water outlet manifold.

F339-Q—What is the setting of this switch and how is it indicated?
A—Set to close at 195 degrees F. Sounds alarm bells in all units and lights red light on engine control panel.

F340-Q—What is the duty of the Field Loop Contactor?
A—Controls dynamic brake field loop excitation circuit.

F341-Q—When is the contactor energized?
A—On leading unit only, when the throttle selector is in "OFF" or "BRAKE" and reverse handle in "FORWARD" or "REVERSE".

F342-Q—How do the magnet valves, contacts and interlocks on the reverser function?
A—Change direction of current through traction motor fields operate in propulsion and sanding control circuits.

F343-Q—What does "FOR" indicate?
A—Indicates those normally closed in "forward".

F344-Q—What does "REV" indicate?
A—Indicates those normally closed in "reverse".

F345-Q—How does the Fuel Pump Contactor operate?
A—Connects fuel pump to Control Cut-Out breaker. Utilized to energize each fuel pump from its own battery.

F346-Q—What is the function of the Forward Reverse Pilot Contactor?
A—A pilot contactor operating time delay relay (used only on older units).

THE ONLY SYSTEM THAT CLEANS THEM ALL

There has long been a need in the railroad industry for an effective method of cleaning the exterior surfaces of diesel and steam locomotives, passenger coaches, and other rolling stock, regardless of contour—and yet, one which would do the job at minimum expense of labor, time, and materials. The Dearborn Pressure Cleaning System is the carefully planned answer to that demand.

It is a combined equipment-material system which incorporates a series of spray standards with water under pressure to clean all surfaces of the unit from trucks to roof. After preliminary wetting of the surface, a Dearborn acid detergent is applied by spray. This is followed shortly by a similar application of a Dearborn alkaline detergent. Next, a spray of water under extremely high pressure rinses away the dirt and soil film previously loosened by the detergents. This spray method of cleaning reaches all the "hard-to-get-at" nooks and crannies on switchers, tank cars, cabooses, and other units of irregular contour—and cleans them thoroughly.

In addition, Dearborn has recently perfected a process for spray-cleaning coaches that *eliminates streaking on exterior surfaces and windows.*

Because of its performance efficiency and its lower cleaning cost per unit, the Dearborn Pressure Cleaning System is fast becoming standard with America's leading railroads. Write for information.

Dearborn® **PRESSURE CLEANING SYSTEMS**

DEARBORN CHEMICAL COMPANY, Merchandise Mart Plaza, Chicago 54, Ill.

WATSON-STILLMAN

Socket-Welding Air Brake Flanges

Simplified installation and strong, tough connections are assured with Watson-Stillman Socket-Welding Air Brake Flanges. Machined from tough steel forgings, these 2-bolt oval flanges are now available in two designs—each interchangeable with other air brake flanges. The W-S One-Piece flange, now standard equipment on many railroad cars, provides a strong, leak-proof joint with maximum resistance to shock and vibration.

The recently developed 2-piece Swivel-Joint Flange was designed to facilitate bolt-hole alignment. The flange can be rotated on the insert to any position until bolt holes line up. The Swivel-Joint flange permits most of the piping to be fabricated in the shop.

Sold Through Leading Distributors

For detailed technical information on Watson-Stillman Air Brake Flanges and other Railroad Pipe Fittings send Today for Bulletin RR-1.

WATSON-STILLMAN FITTINGS DIVISION

HKP **H. K. PORTER COMPANY, INC.**
Roselle, New Jersey R2

SUPPLY TRADE NOTES

(Continued from page 90)

chanical engineer of the Northern Pacific at St. Paul, has been named chief engineer for Stran-Steel transportation products. *O. S. Laing*, sales representative at Detroit, has been appointed Chicago district manager, and *John A. Ferguson* has been appointed district manager at New York.

■

HARVEY D. WELCH LUMBER COMPANY.—*Robert L. Belt* has been appointed sales manager. The company furnishes lumber supplies for railroad car shops. Mr. Belt was formerly vice-president of Mather Stock-Car Company.

■

JOSEPH T. RYERSON & SON.—*Allen P. Beckloff*, manager of the tubular products and cold finished bar division of Ryerson, has been appointed manager of the Boston steel service plant, succeeding *Park Sanderson*, retired.

■

CHROMIUM CORPORATION OF AMERICA.—*Fay Thomas*, formerly general superintendent, diesel-electric, of the New York Central, is now associated with the Chromium Corporation as manager of railroad sales for the Cleveland plant.

■

TOLEDO PIPE THREADING MACHINE COMPANY.—*C. E. Hartsing* has been appointed manager of field sales, with headquarters in Toledo. Mr. Hartsing was previously western sales manager.

■

VANADIUM CORPORATION OF AMERICA.—*Joseph H. McGraw*, sales office manager at New York, has been appointed assistant district manager, Cleveland district. He has been succeeded by *Daniel A. Hackett*.

■

BUDD COMPANY.—*Griscom Bettle, Jr.*, a member of the sales project staff specializing in demonstration of the Budd rail diesel car, has been appointed sales representative of the Railway division.

■

PULLMAN COMPANY.—*James F. Flannery*, mechanical assistant, has been appointed general superintendent of shops.

■

GRIFFIN WHEEL COMPANY.—*Goff Smith*, manager of railway specialties sales, American Steel Foundries, has been appointed executive vice-president of Griffin, a subsidiary. *Roger G. Kimber* succeeds Mr. Smith.

■

STRATOFLEX, INC.—*W. D. Rothell*, sales engineer at Kansas City, Mo., has been named West Coast district manager at Los Angeles, succeeding *A. B. Quinn*, resigned.

Obituary

HARRY D. SHAW, 60, railroad service representative for National Aluminate Corporation, died August 9.

■

HERBERT J. FRENCH, 62, vice-president of International Nickel Company and assistant vice-president of International Nickel Company of Canada, died August 17, at Rochester, Minn.

It's easy to

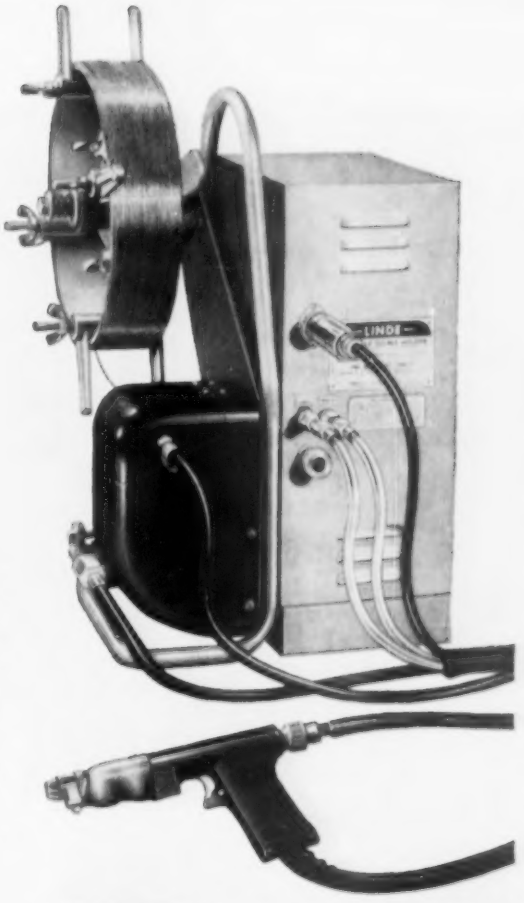
CUT WELDING COSTS

when you use a High-Speed

LINDE SWM-2

Trade-Mark

Portable Sigma Welder



Your welding department can easily make high-speed, low-cost fusion welds in aluminum, stainless steel, high temperature alloys, copper, carbon steel, and other metals with the LINDE SWM-2 Portable Sigma Welder. The LINDE SWM-2 is a complete control unit for manual sigma (Shielded Inert Gas Metal Arc) welding operations. It mechanically feeds welding wire from a coil into the weld area at a steady precontrolled rate and supplies a regulated quantity of argon to shield the weld from contamination by the atmosphere. No flux is used. In most cases the smooth, clean sigma welds need no post-welding treatment.

SIMPLIFIED AUTOMATIC OPERATION

The operator merely presses the trigger of the pistol type torch to energize the control circuit and start the flow of water coolant and argon gas. When an arc is struck by touching the consumable electrode to the workpiece, the wire feed automatically begins.

NEW CONSTANT POTENTIAL POWER SUPPLIES CAN BE USED

Either ordinary or constant potential DC power supplies can be used with a LINDE SWM-2. In constant potential welding arc voltages are preselected and held with outstanding consistency which permits positive starts and high-speed welds on thin metals.

Call your nearest LINDE office today for more information on how you can cut production welding costs with the LINDE SWM-2 Sigma (Shielded Inert Gas Metal Arc) Welder. Or write for your free LINDE SWM-2 catalog.

Production jumped 300% when the Heller Engineering and Manufacturing Company, Lynwood, California changed to sigma welding to fabricate aluminum engine shipping stands. Because the sigma welds were clean and sound, post-welding treatment was practically eliminated.

RAILROAD DEPARTMENT

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

Offices in Other Principal Cities

In Canada: LINDE AIR PRODUCTS COMPANY

Division of Union Carbide Canada Limited, Toronto

(formerly Dominion Oxygen Company)

The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

Supplying to railroads the complete line of welding and cutting materials and modern methods furnished for over forty years under the familiar symbol - - -

RE-ORDER #3

You can't take an International Caboose on a "test drive" and judge it from one performance the way you would an automobile . . . but you can get a real test of its worth when you record its operation in service. That's what Chicago & North Western did with its first order in 1952 for 12 cabooses from International.

In 1953, Chicago & North Western re-ordered 25 cars, and in 1955 our shops turned out order #3 for an additional 25. This "case history" is but one of the many that tell the story of International's leadership in its specialized field — why not put it to use on your railroad?

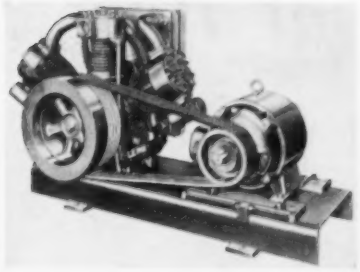
International RAILWAY CAR CO.

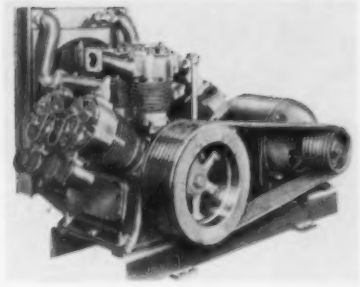
General Offices: 814 Rand Bldg., Buffalo, N. Y.

SPECIALISTS IN CABOOSES

NEW DEVICES

(Continued from page 10)

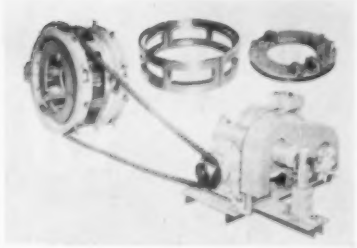




Motor-Driven Compressors

These two-stage, air-cooled, electric motor-driven compressors, with 50, 75 and 100 hp ratings, have displacements of 260, 415 and 550 cfm at 125 psi operating pressures. The three-cylinder Model 5OS2 and six-cylinder Models 75S2 and 100S2 have a balanced design which reduces vibration and noise to a minimum.

The cylinders of alloy iron are cooled by a belt-driven fan which draws air through a sectional-core intercooler. Each bank of cylinders has individual intake filters. Standard equipment includes a dual control which gives the operator a choice of start-and-stop duty of both motor and compressor or a continuous running of motor with intermittent compressing. *Le Roi Division, Westinghouse Air Brake Company, 1706 S. 68 street, Milwaukee.*



Diesel Crankshaft Refinishing Tool

The Model C refinishing tool can be used to finish crank pins within the engine and without removing the crankshaft. It is said to be equally well adapted for use in engine overhaul shops where many engines are completely dismantled.

The device runs on two split adapters that bolt on to crankcheeks. The unit, itself, is built in halves, one half carrying the cutting bits and the other half carrying the honing stones. Accuracies of less than 0.001 in. in roundness and finishes of 32 micro in. are quickly obtained. The tool is available in five sizes for crank pin diameters of 4 to 20 in. *Aero-Motive Manufacturing Company, 1803 Alcott street, Kalamazoo, Mich.*

Electrician Tools

A skinning knife with a plastic insulated handle is one of two new tools for electricians. Its blade is 3 in. long, fabricated from tempered cutlery steel. The handle provides insulation from shock and a comfortable grip and is red in color. The back of the blade is flat for scraping, and the bevel of the blade overcomes build-up of insulation when skinning weatherproof insulation. It has a ring on the handle for fastening to a snap.

(Continued on page 104)

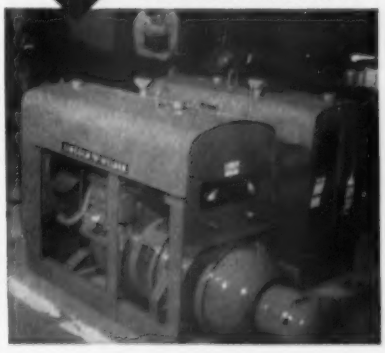
"LINCONDITIONING"

LINCOLN FACTORY REBUILDING

provides new welder performance from your old machines *AT LOW PRICE!*

BEFORE "LINCONDITIONING"

AFTER "LINCONDITIONING"



GUARANTEED PERFORMANCE

- New machine guarantee goes with every remanufactured welder

LOW COST

- Cost of "Linconditioning" is less than half the price of a new machine.

PRECISION REPLACEMENT PARTS

- All parts are reconditioned and returned to new product standards or are replaced with new parts.

MORE INFORMATION

Learn how "Linconditioning" can cut your repair and replacement costs. Details in Bulletin 480-4. Write on your letterhead to The Lincoln Electric Railway Sales Company, 11 Public Square, Cleveland 13, Ohio. Railroad representatives of

THE LINCOLN ELECTRIC COMPANY

Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

...You can't beat these drop-head dies for easy work, perfect threads...and long trouble-free service!

Every RIDGID Pipe Tool TESTED before shipment

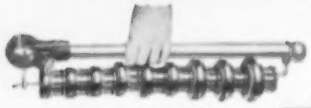
RIDGID

Drop-Head Dies

for ⅛" to 2" pipe

Each size die head snaps instantly into ratchet handle. Dies reverse quickly for close-to-wall threads, easily removed for re-grinding. Left hand dies available.

00R, ⅛" to 1"
111R, ⅛" to 1¼"
12R, ¼" to 2"



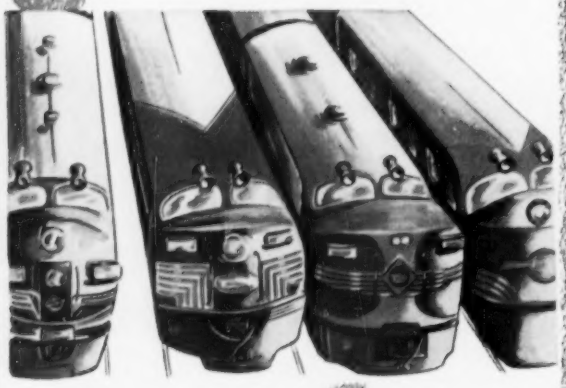
Carrier free with complete sets.

Every RIDGID Pipe Tool individually TESTED before shipment.

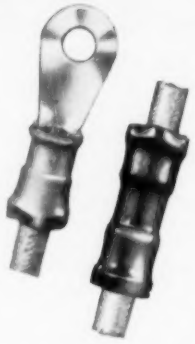
Buy them from your Supply House.

The Ridge Tool Company • Elyria, Ohio • U.S.A.

Right from the word go!



. . . There is a reason why most manufacturers of Diesels and rolling stock specify AMPLI-BOND for electrical connections in wire sizes from #8 to 4/0. It's because AMPLI-BOND Terminals and Connectors are designed to fill the specialized requirements for railway use. They are rugged enough to stand up under constant use and pre-insulated to eliminate wrapping, tape or spaghetti. The rough vinyl insulation is bonded to the terminal barrel; won't slip off or crack under crimping pressure. Hand Hydraulic and DYNA-CRIMP tools have positive crimping action to make fast, high tensile strength crimps.



Ampli-Bond

Terminals and Connectors and crimping tools for wire sizes #8 to 4/0.

AMP

AIRCRAFT-MARINE PRODUCTS, INC.

2100 Paxton St., Harrisburg, Pa.

In Canada:
Aircraft-Marine Products of Canada, Ltd.
1764 Avenue Road
Toronto 12, Ontario, Canada
©A-MP®

Wyandotte Exhibit at the
Allied Railway Supply Convention,
Hotel Sherman, Chicago, September, 1955

Wyandotte
SPECIALIZED CLEANERS--METHODS--SERVICE!
WYANDOTTE WASHES THESE DIESELS IN 6 MINUTES FOR CB&Q
WYANDOTTE KEEPS THESE DIESELS LOOKING LIKE NEW!
IN LIKE THIS - OUT LIKE THIS

It's pleasing to us to be able to show the actual results (and savings, too) of Wyandotte products to visitors at a Railroad Show like this.

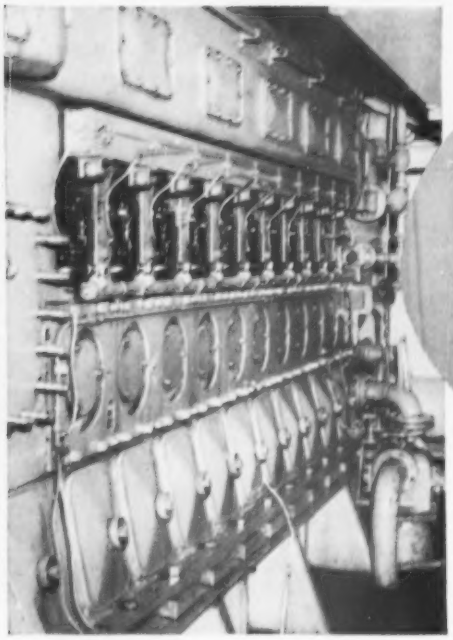
But, the big point is, these same results must be even more pleasing to railroad people, because more and more railroads are buying more Wyandotte products each year.

May we serve you now?

Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, Calif. Offices in principal cities.

Wyandotte CHEMICALS
J. B. FORD DIVISION

SOME OF OUR COMPLETE LINE OF PRODUCTS FOR RAILROADS: WYANDOTTE 75 • WYANDOTTE RILLOR® • WYANDOTTE 21 • WYANDOTTE 30 • ALTREX® • WYANDOTTE 40 • WYANDOTTE 548



Periodic cleaning with Diesel Magnusol and water keeps engines spotlessly clean.

For Fast, Low Cost Engine Room Cleaning... MIX IT WITH WATER

Fast yet thorough removal of greasy, oily dirt from diesel engine exteriors and from walls and floors of engine rooms is a Diesel Magnusol job!

A cleaning solution made up of Diesel Magnusol mixed with water, floats away stubborn dirt as if by magic!

Save Time and Labor

. . . because Diesel Magnusol penetrates oily dirt so that it is removed in a minimum of time and with little labor.

Completely Safe, too

The cleaning solution is harmless to paints and metals. It is non-flammable, fumeless, odorless and non-toxic.

TRY DIESEL MAGNUSOL mixed with water for cleaning engines and engine rooms.

magnus CLEANERS

Railroad Division

MAGNUS CHEMICAL CO., INC.

77 South Avenue, Garwood, N. J.

Send us details on the money-saving use of Diesel Magnusol for engines and engine rooms.

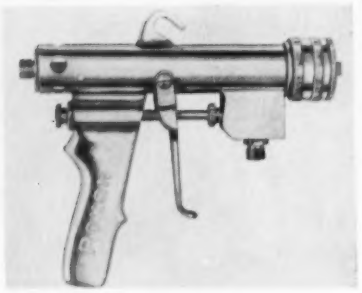
NAME_____ TITLE_____

RAILROAD_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

The second device is a plier, with plastic dipped handles, which, according to the manufacturer, provide a heavy plastic coating that is resilient to the hand and will not come off in use. Available in red, blue, black, yellow or green. *Mathias Klein & Sons, 7200 McCormick road, Chicago 45.*



Spray Paint Conversion Gun

With this unit it is possible to instantly convert high pressure paint spray systems to low pressure. Conversion is made possible by use of spray gun that is attached to standard high pressure air and paint hoses.

The unit, Model 501 Volumaire, handles all standard paints, varnishes, lacquer emulsions, lacquers, enamels or white washes with either internal or external atomization and produces a round or flat jet, ½ in. to 16 in. wide. Air at the rate of 50 psi and 6 cfm is automatically converted by a venturi in the gun to 1-½ psi and 60 cfm thereby eliminating backspray, overspray and spraydust. It is possible to spray indoors and outdoors without masks, goggles or spray booths. *Roxon, Inc., 50 Broad street, New York 4.*

Railroad Radio Control Head

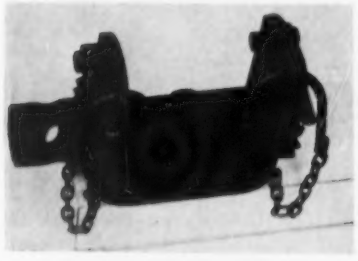
A railroad radio control head, said to provide savings in time, labor, and expense in an original installation, has a weatherproof, bakelite-impregnated-cone speaker which is an integral part of the control unit. It eliminates the need for a separate

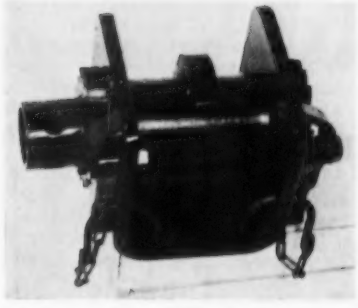
speaker installation, thus reducing installation space.

The control head is available in two models, one with automatic frequency reverting, and the second with a provision for two frequencies but no automatic reverting. The head is interchangeable with previous mechanical and electrical control heads made by the manufacturer. It is recommended for use with a 64-volt power supply. *Motorola Communications & Electronics, Inc., Railroad Department, 4501 Augusta boulevard, Chicago 51.*

Tank-Car Cleaner

Fogging unit, Model 523, offers a time-saving method of cleaning tank car interiors without manual brushing. It consists of two opposing, stationary nozzles mounted on the end of a long twin-tube structure, which is placed in dome of tank car for cleaning. Steam and detergent solution are fed to the nozzles, where the two combine and are sprayed on interior surfaces. Spray comes from the nozzles in the form of a detergent-saturated steam fog which settles on the soils. Detergency plus melting action of the steam provides cleaning action. The unit is easy to install, and operate, and is used also for rinsing. *Oakite Products, Inc., 19 Rector street, New York 6.*

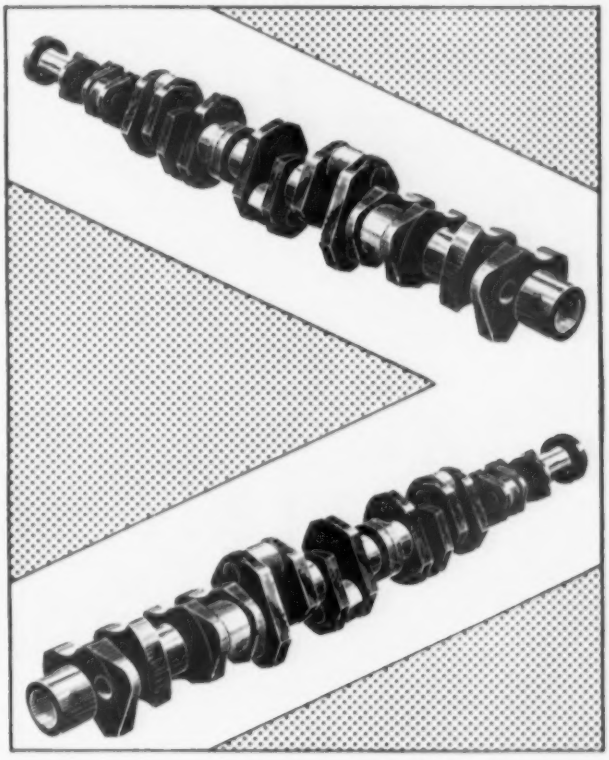




Piggy-Back Tie-Down Devices

Two tie-down winches for anchoring highway trailers on flat cars, are built on 5/8-in. one-piece steel frames, and are tightened with a bar passed through holes in a drum extension at one end. The drum in both models is held in a fixed position by ratchet pawls. The model 6458TB tie-down winch, for anchoring at each end of a trailer, is designed to absorb the longitudinal shocks

CRANKSHAFTS



Chromium Plated

by

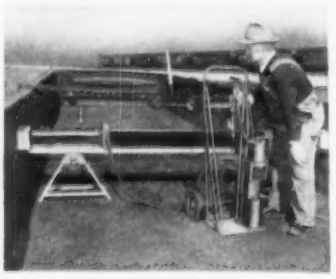
VAN DER HORST

OLEAN, NEW YORK TERRELL, TEXAS

This Duff-Norton 30-TON capacity jack operates from any air supply of 80 to 100 lbs.—portable—offers choice of any or all of 5 interchangeable hydraulic rams, each totally enclosed in special "grit guard" for long, trouble-free operation in any position. Ram can be stopped precisely and instantly at any position when raising or lowering by removing finger from spring loaded air valve mounted on truck. Safe, economical, easy to use, these new air-hydraulic jacks are winning new friends in railroad shops everywhere.

For complete specifications, write today for Bulletin AD 25-G, to the world's oldest and largest manufacturer of lifting jacks, Duff-Norton Company, P. O. Box 1889, Pittsburgh 30, Pennsylvania, Canadian Plant —Toronto 6, Ontario.

1. Loads go up or down quickly.



2. The operator is always safe.

DUFF-NORTON

"Giving Industry A Lift Since 1883" **Jacks**

developed in train operation. Anchor cable up to ¾-in. is fastened to an outer drum. An arrangement of vanes and rubber elements between this drum and the inner drum provides the snubbing action. There will be a cable movement of 1½-in. with a load of 30,000-lb, and then the rubber ceases to cushion the load. The subsequent metal-to-metal contact has been tested up to 50,000-lb loading.

The 6M4 winch is designed for tie-down across the car and does not incorporate the outer drum and rubber snubbing. Up to ¾-in. cable can be wound directly on the inner drum. The use of these devices is said to greatly speed trailer tie-down. *Brandon Equipment Company, 323 S. Michigan Avenue, Chicago.*

Hydraulic Riveting Gun

The ½-in. Huckbolt can be driven with this compact, lightweight, rugged hydraulic pull gun. Few moving parts and heat treated steel contribute to the long life of this 14½-lb tool. It has a working stroke of ⅝-in. and a rate of 50 to 60 strokes per min. The fasteners are driven successively without turning the gun on and off each operation. The Huck power cell drives this tool. *Huck Manufacturing Company, 2480 Bellview avenue, Detroit.*

Insulating Structural Reinforcement

Urethane foam as a core material combines lightness, strength and rigidity. The aircraft industry has made extensive use of this material as a lightweight reinforcing core between metal skins. The structural members so formed have a high strength-to-density ratio and are very lightweight. One of the outstanding applications of urethane foam is that is can be foamed in place to fill any cavity regardless of the shape. This eliminates the need for cutting and shaping.

The foam is produced by mixing two liquid components at room temperature and pouring the resulting mixture into the

Always an operating hazard—and a constant drain on the maintenance budget—rust is a doubly dangerous enemy now when it is difficult to obtain metal replacements.

RUST-OLEUM stops rust effectively—is the practical answer to many railroad rust problems. Its tough, pliable, rust-resisting film gives excellent protection to bridges, rolling stock, metal buildings, signal equipment, tanks and many other rustable metal surfaces.

CUT YOUR MAINTENANCE COSTS

RUST-OLEUM cuts maintenance costs in two ways. (1) It prevents rust on new rustable metal surfaces so that costly replacements can be deferred longer than previously could be expected. (2) Because RUST-OLEUM can be applied *even* over metal already rusted—usually without sandblasting or the use of chemical rust removers—it saves many, many man hours. *Write for your copy of the NEW RUST-OLEUM Railroad Catalog.*

RUST-OLEUM CORPORATION
2590 Oakton Street, Evanston, Illinois

Available in colors, and aluminum

Manufacturers' Literature

Following is a compilation of free literature, pamphlets and data sheets offered by manufacturers to the railroad industry. Circle the number(s) on coupon below to receive desired information. Requests will be forwarded direct by the manufacturers.

1. PORTABLE CORDS. *Anaconda Wire & Cable Co.* 8-page 2-color brochure (DM-5538) describes, illustrates and gives specifications for "Anaconda Portable Cables", Securityflex for rugged applications, Industrial for severe industrial uses, and Service for hard service applications.

2. ELECTRIC CABLE VULCANIZERS. *Joy Manufacturing Co.* 16-page 3-hole punched bulletin (B-48a) "Joy Electric Cable Vulcanizers Keep Cable Upkeep Down, Save Power, Time & Lives", describes and illustrates newest addition to Joy line of electrically-operated cable vulcanizers.

3. FREIGHT CAR ENAMEL. *Sherwin-Williams Company.* 4-page 2-color brochure (S 3495) "New One-Coat Cold Spray The Equal of Two Standard Coats" describes the new synthetic freight car enamel Kem Kold Bild.

4. SILICONE RUBBER. *Dow Corning Corp.* 4-page 2-color folder (9-102) "Design Longer Life and Greater Efficiency Into Your Products With Silastic, The Dow Corning Silicone Rubber", in five sections details properties and performance.

5. STORAGE BATTERIES. *Gould-National Batteries, Inc.* Additional material available on storage battery selection, charging, handling, maintenance, inspection and testing for starting diesel locomotives in the Plus-Performance Plan.

6. ARC WELDING CONTROL. *Worthington - Mullenbach Controls Div. Worthington Corp.* 4-page 3-hole punched bulletin (R-1700-B 17) on Arctrol (portable, remote control) for arc welding machines illustrates, gives application data, and describes simplicity of operation.

7. GEARS. *Foote Bros. Gear and Machine Corp.* 24-page 3-hole punched catalog "Foote Bros. Facilities," Foote Bros. facilities for manufacturing precision gearing and complete power transmission mechanisms.

8. SEALED JOURNAL BOX. *National Motor Bearing Co.* 28-page pocket sized maintenance manual (303) "Instructions for Installing and Servicing NMB Sealed Journal Box Kit" for railroad mechanical personnel includes in four sections: description, installation, maintenance and emergency operation data.

9. INDUSTRIAL FIBERS. *The Pacific Lumber Co.* 4-page folder (502) "Palco Industrial Fibers" describes, illustrates, and gives industrial applications and physical and chemical properties of four "Palco" industrial fibers produced from redwood and redwood bark; samples of each fiber included.

10. MILLING MACHINES. *Axelson Manufacturing Co.* Bulletin describes and illustrates the new Axelson Models 10R Ram Turret Vertical Milling Machine and 10RH Ram Turret Duplex Milling Machine; points out features.

11. BABBITT METAL. *Graphitized Alloys Corp.* 4-page brochure announces and describes graphite-containing lead-base babbitt "Grac"; describes ten outstanding advantages; includes proven uses, outline of proper use, outstanding properties, composition and mechanical properties.

12. METAL FABRICATOR. *Kling Brothers Engineering Works.* 6-page Complete Line Bulletin (100) "Kling Metal Working Machinery" illustrates and describes the basic Kling models for over 50 different machines for metal fabricating.

13. SHEAVES. *Allis-Chalmers Mfg. Co.* 4-page 3-hole punched bulletin (20B6082C) "Allis-Chalmers Texrope Drives, Vari-Pitch Sheaves" describes and illustrates stationary and motion control Vari-Pitch sheaves.

14. LATHE CALCULATOR *(Price $1.00). Cincinnati Lathe & Tool Co.* New turning calculator (catalog T-127) aids selection of lathe feeds and spindle speeds for most rapid turning (side labeled "Lathe Set-Up Calculator") and helps determine most economic cutting speed (side labeled "Economic Cutting Speed"); these unique turning calculators complete with instruction book *available for $1.00 for each set.* Payment *must* accompany request!

15. VERTICAL TURBINE PUMPS. *Layne & Bowler Pump Co.* 8-page 2-color bulletin (100) "L & B Verti-Line Pumps for industrial and municipal primary water supply" describes and illustrates Layne & Bowler Verti-Line Primary water supply pumps; sectional drawings with enlarged views describe products.

16. TEMPERATURE INDICATORS. *Tempil Corp.* Revised 6-page 2-color catalog (541) describes and illustrates complete line of crayons that tell temperatures; discusses how crayon mark melts when desired temperature is reached.

Reader Service Department OCTOBER, 1955
Railway Locomotives and Cars
30 Church St., New York 7, N. Y.

Please send literature circled below:

1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16

Also, please send me additional product information as follows: (company, product & page number)

Name **Title or position**

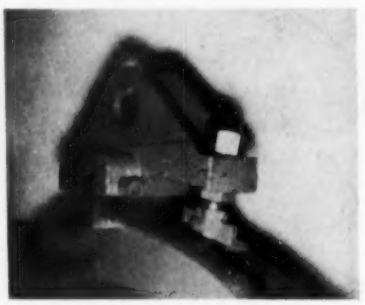
Company

Address

City **Zone** **State**

space to be filled. A product will result whose physical properties and characteristics are predictable and reproduceable without complicated equipment or handling. This means lower costs in equipment, storage, handling and fabrication. When set, Urethane foam supports the walls enclosing it at every point on their inner surfaces and is strongly adhered to them.

These foams have a thermal insulating value twice that of cork. They are water-resistant, rot and fungus proof, chemically inert and absorb sound and vibration. They can be drilled, sawed, milled or sanded. The material has been recommended as a core material for passenger, box and refrigerator cars. Already several refrigerator car installations have been made. *Nopco Chemical Company, Lewis and Carter streets, Harrison, N. J.*



Flange Turner

Depth of cut with the Transall Model HH-2 Flange turner is controlled by adjustment of the two pads that run on the tread of the wheel. The device, designed to cut down high flanges without removing diesel locomotive wheels, is installed in place of the brake head at the wheel to be worked. Both flanges on a single wheel set should not be turned at the same time. If all the wheels on a truck must be machined, then the turners should be applied at diagonally opposite corners.

The operation is done with a brake cylinder pressure of 20 psi and a locomotive speed of about 5 mph. It is said that actual machining time is about 30 min. *Transall Inc., Railway Division, P.O. Box 1588, Birmingham 4, Ala.*

Brake-Cylinder Lubricators

Lube-Rings and Lube-Strip lubricators are made from graphited porous rubber and felted cotton fibers. When these rings or strips are used in brake cylinders and around the hollow rod, the continuous flow of graphite lubricating material forms a long wearing, frictionless, sliding surface. The lubricators are said to eliminate possible piston-cup swelling encountered when using petroleum-base cylinder lubricants.

They are manufactured to close toler-

ances for precision fit around the air brake piston and hollow rod. A built-in resilient property maintains even pressure of the lubricator with the surface to be lubricated. *Gustin-Bacon Manufacturing Company, 210 W 10th street, Kansas City 6, Mo.*

Crankshaft Grinding Refinement

Crankshafts are floated on air at the main bearing journals to allow them to lie straight and parallel during the grinding operation. Recently installed equipment known as the Precision crankshaft balancers are now part of the grinding machines operated by this supplier at plants in Los Angeles and Mt. Vernon, Ill. With all the crankshaft weight removed from the grinder, the shaft lies straight to eliminate all stresses and sag during the grinding of both the connecting rod and main bearing journals. It is said that this permits grinding to much closer tolerances. *Precision Engineering Company, 1717 E. Slauson avenue, Los Angeles.*

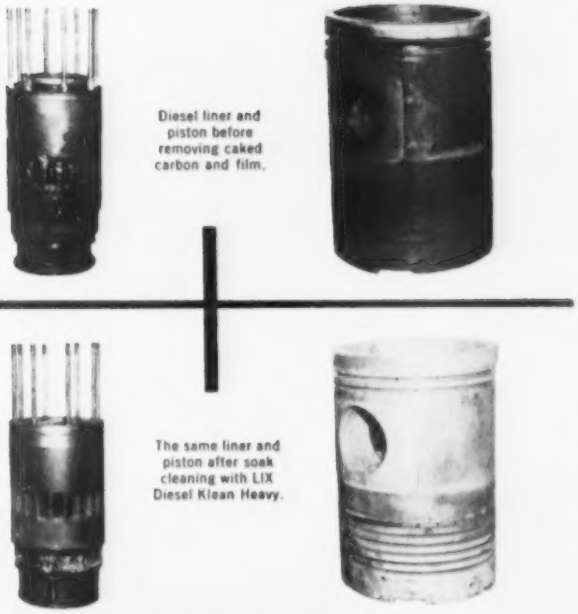
Slabbed Head Set Screw

The Flush-Lok is designed to extend the inherent strength of slabbed head set screws to cover applications in which the slab portion cannot extend beyond the tapped hole. It retains a positive locking action in all positions. Being flush with the surface, the screw is practically tamper-proof as well as resistant to accidental removal.

The screw is made with an undersize slab to permit flush insertion. Supplied in the manufacturer's Nu-Cup design, it offers the holding power advantages of a 42 per cent sharper angle and is suitable for hopper feeding. *Set Screw & Mfg. Co., Main street, Bartlett, Ill.*

Faucet Water Heater

The Thermjet attachment is applied to standard faucets up to 15/16 in. size without tools and is readily transferred from one faucet to another. It is said to produce hot water from the coldest supply within two seconds. The long water path made of


Diesel liner and piston before removing caked carbon and film.
The same liner and piston after soak cleaning with LIX Diesel Klean Heavy.

SOAK AWAY CAKED CARBON

WITH **LIX DIESEL KLEAN HEAVY**

- NO BRUSHING NECESSARY
- LEAVES NO GRANULAR DEPOSITS
- REDUCES AFTER-RUSTING
- DOES NOT INTERFERE WITH PARTS INSPECTION

Lix is harmless to all types of metals during the cleaning cycle. Cleans any metal safer and faster...and in the same tank. Leaves no granular deposit on close tolerance screw threads.

All working parts of Diesel Locomotives, such as Injection Nozzles, Bronze Filters, Bearings, Aluminum Air Blowers, Lube Oil Coolers, etc., can be cleaned more economically.

All spent Lix Diesel Klean can be reduced and used for cleaning trucks, pits, and etc.

Manufacturers of Lix Diesel Klean Heavy and Lix Electric Equipment Cleaner

A LIX Representative Will Be Glad To Demonstrate In Your Shop How He Can Save You Time and Money.

WRITE OR CALL TODAY FOR A FREE DEMONSTRATION IN YOUR SHOP!

THE Lix CORPORATION

PRODUCTS OF RESEARCH

716 EAST 85TH STREET, DEPT. RL-10
KANSAS CITY, MISSOURI

It's time you asked:

What's behind the success of aluminum bearings?

Since Alcoa first introduced them in 1938, aluminum bearings have been making deep inroads where bimetallic bearings were considered standard. Little by little, management groups in all industries have seen competitors' problems solved by the adoption of them—and hundreds have asked, "What IS behind the success of aluminum bearings?"

For one thing, aluminum bearings are *one piece.* Heat is evenly distributed, quickly dissipated. The relative softness of aluminum bearing materials prevents scoring of shafts by dirt particles. Yet aluminum is hard enough to groove slightly, and "roll out" particles, and allow them to be trapped by the oil filter. What's more, these long-lasting bearings in many cases actually *cost less than the bearings you're now using!*

Alcoa's team of research and development engineers spent years in the development of this special bearing alloy. These men, already familiar with the railroad industry, knew the alloy must have optimum resistance to corrosion; must offer the last word in load-carrying ability.

Working hand-in-hand with Fairbanks-Morse, these Alcoa engineers developed, machined and installed the world's first aluminum bearings for diesel locomotives. Now, after years of trouble-free experience with them, Fairbanks-Morse specifies Alcoa® Aluminum Bearings for the full engine set in their great new TRAIN MASTER Locomotive!

So, it's time you asked, "What's behind the success of aluminum bearings?"—and the man to ask is the Alcoa sales engineer, or call your nearby Alcoa sales office. The number is listed under "Aluminum" in the classified section of your telephone directory. Or write: ALUMINUM COMPANY OF AMERICA, 1986-K Alcoa Building, Pittsburgh 19, Pennsylvania.

Your Guide to Aluminum Value

FASTEN ALUMINUM WITH ALCOA ALUMINUM FASTENERS

AIR engineering at work
REPORT No. 4400.05

Running Ten Nuts at a Crack...

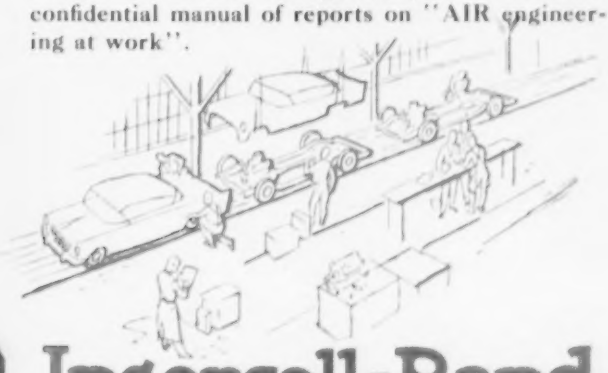
SAVES $12,000 *a year!*

This large auto manufacturer formerly used two ¼ ton presses to position a differential carrier in the rear axle housing. Then the ten ⅜" nuts were run individually. Only experienced operators could control torque so that it met specifications. Naturally the engineers wanted to eliminate the press operation and improve torque control.

AIR engineering by Ingersoll-Rand provided the answer and saved $12,000 a year. A 10-Spindle Multiple Nut Runner is now suspended over the moving conveyor. The differential carrier is hand set on the housing, and dropped to within ⅛" of its final location. The 10-spindle nut runner quickly and accurately draws it into final position as it runs all 10 nuts at once . . . and to the required 50 ft. lbs. torque. The press operation is eliminated, and simultaneous running of the nuts eliminates binding.

If you are in any way responsible for cutting costs in your plant, write us on your company letterhead, and we will arrange for you to see I-R's confidential manual of reports on "AIR engineering at work".

Ingersoll-Rand Multiple Nut Runner runs 10 nuts at once, all to exact torque.



Ingersoll-Rand

11 Broadway, New York 4, N.Y.

AIR engineering Manual

Don't miss over 100 interesting case history applications of AIR engineering in this confidential manual.

8-147

a series of winding constricted channels has an electrical resistance of over 500,000 ohms and permits a current flow of only ⅙ milliamp. The position of the faucet handle determines the water temperature. With the handle just opened, the water is steaming hot. Water temperature decreases as the faucet is opened. When the faucet is completely closed, there is not current flow even though the unit is still plugged in. The Thermojet weighs 3 lb and measures 3 x 4½ in. *Greatex Products, Inc., 890 Sixth avenue, New York 1.*

Flashing Warning Light

Type 15360 Gyralite warning signals are for use on moving equipment such as diesel switcher locomotives, cabooses, cranes, and material handling shop trucks. The beam of the sealed beam lamp is reflected at right angles by the dual inclined plane reflector which revolves at 48 rpm, projectioning 96 flashes per minute in a horizontal plane. The reflector is mounted directly to the geared motor shaft which is conducive to low maintenance because all moving parts are motor components.

A three-wire terminal block is provided in the base for the motor and lamp leads. The lamp is readily accessible through the gasketed hinged door at the top. Various colors are available. *Pyle-National Company, 1334 N. Kostner Avenue, Chicago.*

FRAHM® and JAGABI®
Speed Measuring Instruments
. . . to meet every requirement
Write for Bulletin 35-X
JAMES G. BIDDLE CO.
Electrical & Scientific Instruments
1316 ARCH STREET, PHILADELPHIA 7, PA.
BE SURE YOU'RE ON THE RIGHT TRACK
ALWAYS SPECIFY
MEGGER®
Electrical Resistance
Measuring Instruments
. . . for all electric, Diesel-electric locomotives and other electrical equipment testing requirements.
Write for File RR #1

Try both-ON US!
Works in seconds!
DEODORIZED
Liquid WRENCH
Loosens Rusted Bolts
nuts . . . screws . . . parts
LIQUID WRENCH
A powerful blend of quick-acting solvents that frees "frozen" parts without breakage. Safe for all metals and alloys.
Makes joints LEAKPROOF!
TiteSeal
GASKET & JOINT SEALING COMPOUND
7 BASIC BLENDS
BRUSH-ON
TiteSeal
LIQUID TYPE NON HARDENING
GASKET & JOINT SEALING COMPOUND
Makes all assemblies leakproof and pressure-tight. Easy to apply with brush-in-handle.
• NON-SOLVENT—WILL NOT HARDEN
• WILL NOT SHRINK, CRACK OR CRUMBLE
• HEATPROOF AND VIBRATION-PROOF
Write for FREE sample
TWO of the many famous SOLDER SEAL products available from your Automotive, Plumbing or Hardware wholesaler.
RADIATOR SPECIALTY COMPANY
Charlotte, N. C.

IDEAL
WIEDEKE IDEAL
TUBE EXPANDERS
for rolling sleeves in diesel cylinder heads
CYLINDER HEAD
Typical cross section of Cylinder Head showing Sleeve. Expander with short Mandrel used at upper end. Expander with long Mandrel used at lower end.
Two style Expanders are shown, other styles quoted promptly. Please supply us with full details of your requirements.
See your Dealer or write us for Bulletin.
THE GUSTAV WIEDEKE COMPANY
DAYTON 1, OHIO

INDUSTRIAL HOSE AND FITTINGS

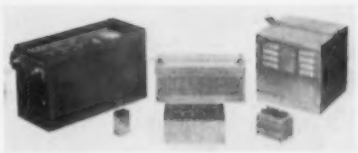
Super resistance to abrasion and corrosion makes this hose excellent for railroads, road equipment, farm machinery, and materials handling equipment. High tensile strength single wire braid. Tough synthetic rubber cover. Working pressures to 2500 psi. Bulk hose and fittings . . . complete hose assemblies at your dealer.

Write for BULLETIN
Dealerships open in some areas.

STRATOFLEX

STRATOFLEX, INC. FORT WORTH, TEXAS
P. O. BOX 10398

BRANCH PLANTS
LOS ANGELES AND TORONTO
SALES OFFICES
ATLANTA • CHICAGO • NEW YORK • SAN FRANCISCO
DAYTON • HOUSTON • KANSAS CITY • PORTLAND • TULSA
IN CANADA
STRATOFLEX OF CANADA, INC. TORONTO 18, ONTARIO



Sealed Nickel-Cadium Battery

The Voltabloc, a hermetically sealed battery, is said to increase service life, dependability and operating economies. This device operates on a non-self-destructive principle, using sintered nickel and cadmium plates that are compressed in a welded metal case. Low internal resistance results in peak discharge rates up to 20 times rated capacity with high usable end voltage.

Being hermetically sealed, they are said to be maintenance-free and have a useful life up to 20 years. Sealing makes the unit leakproof and free from any corrosive gas discharges in normal operations. They can be located in confined spaces or close to delicate instruments without risk of damage. They are compact and occupy only one-fourth to one-fifth of the space filled by conventional starting batteries delivering similar discharge rates according to the manufacturer.

The batteries are said to be practically indestructible both electrically and mechanically under severe service conditions of shock, vibration, discharge or overcharge. Sizes range from 0.8 amp hr up to units for starting large diesel engines. Operations can be at temperatures from minus 40 deg F to plus 160 deg F. *SAFT Corporation of America, Lodi, N. J.*

Axle Journal Tools

Standard carbide-tipped tools and holders are now available for axle journal turning operations on Sellers lathes. With these inserted tools, reground tool bits can be placed in the holder, adjusted to original cutting dimensions and locked in place. The manufacturer claims that the user receives long tool life through adjustment, simplified and minimum grinding as well as low replacement cost of inserted tools. *Apex Tool & Cutter Co., 237 Canal street, Shelton, Conn.*

for greater
RAILROAD
MAINTENANCE
SERVICE

FINE ORGANICS offers
2 EMULSION CLEANERS
that excel in

- ✓ SOLVENCY
- ✓ DETERGENCY
- ✓ DIRT PENETRATION
- ✓ EASE OF RINSING
- ✓ NON STREAKING
- ✓ NON STAINING

F.O.-106

Specifically designed for exterior car cleaning . . . the degreasing and cleaning of mechanical parts, motive equipment, engines, engine pits, shop floors.

F.O.-116

Made to fulfill the need for a heavy duty cleaner and degreaser. Used for rugged jobs, under carriages and exteriors, running gear and surfaces — and areas subject to heavy oil, asphalt and other tenacious accumulations.

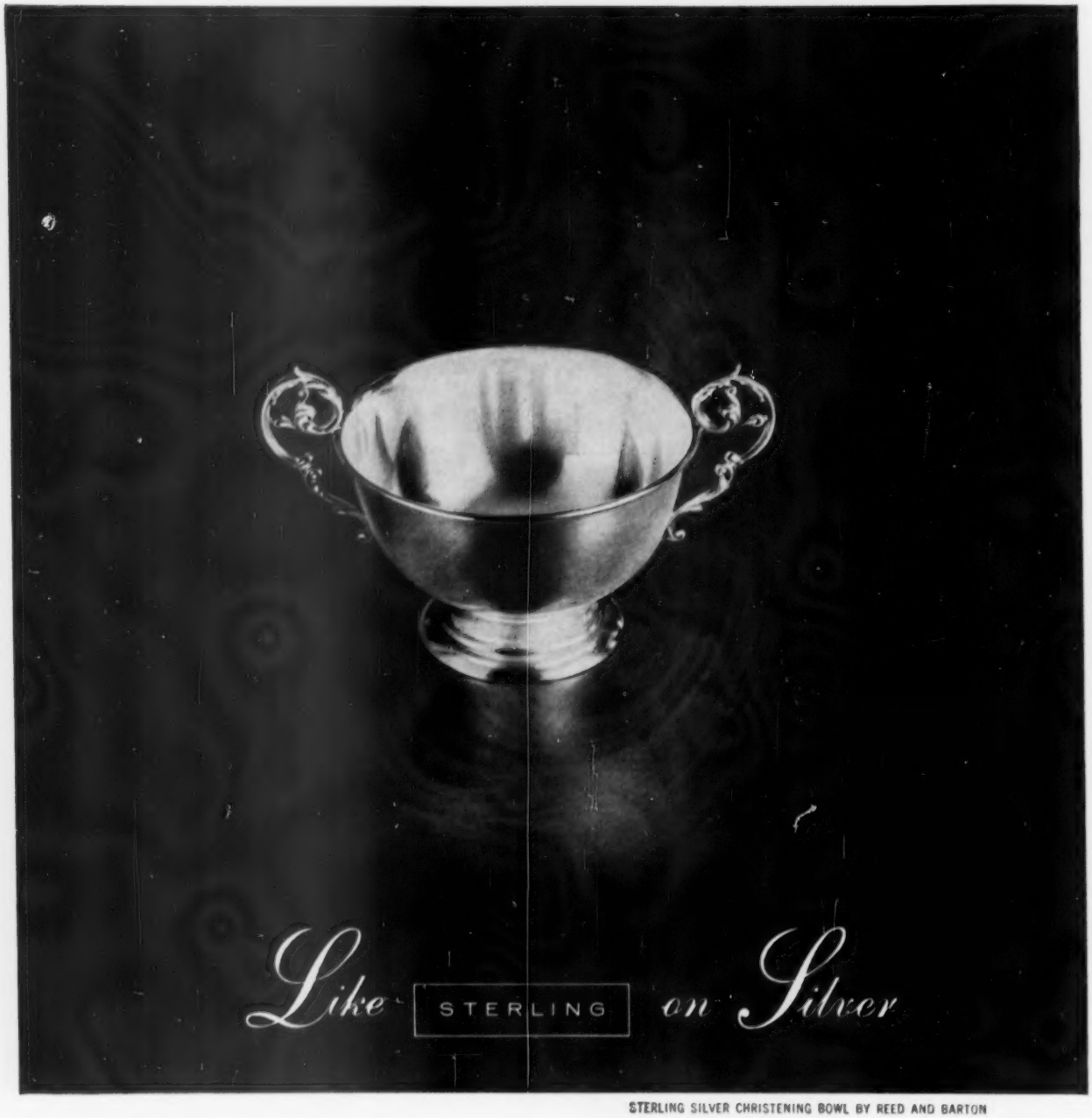
The superior solvency of these two emulsion cleaners . . . the effective dirt penetration and easy rinsability cuts cleaning costs and saves valuable personnel time

also available **F.O.-162** and **F.O.-102** Carbon Removers

F.O.-128 and **F.O.-101** 'Safe-tee' Solvents

Write to Dept. 'J', for complete information

FINE ORGANICS, Inc.
211 East 19th St. - New York 3, N. Y.

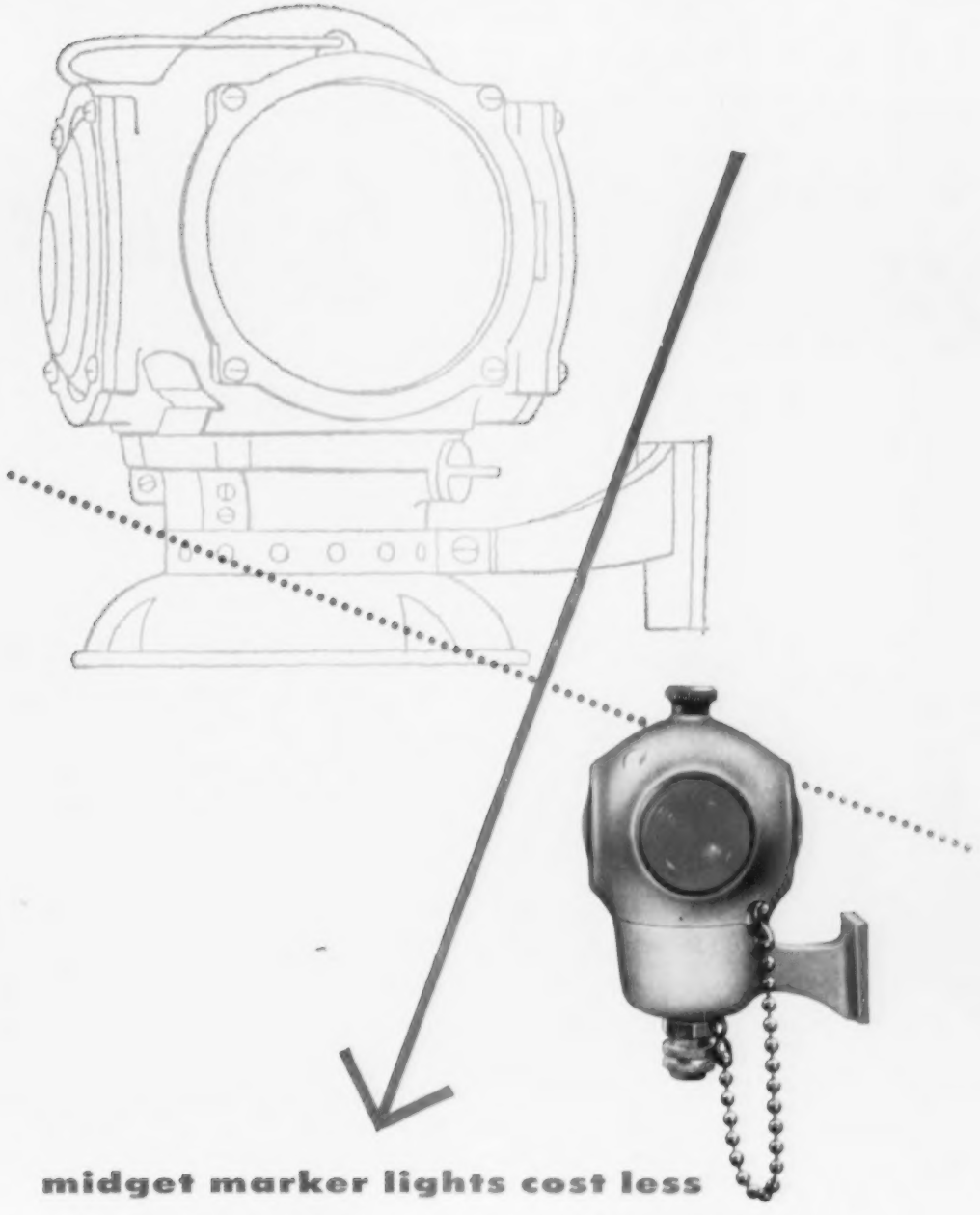


STERLING SILVER CHRISTENING BOWL BY REED AND BARTON

AUDITED PAID CIRCULATION ABC

This symbol means quality circulation. Only publications with paid circulations are members of ABC. They are worth the advertiser's dollar because they have proved to be worth the reader's dollar.

RAILWAY LOCOMOTIVES AND CARS —a charter member of the ABC.



midget marker lights cost less

- 1/3 normal size
- lighter weight
- greater beam intensity
- better visibility
- longer service life
- ideal for caboose circuits

A new product representative of Pyle-National's progressive engineering and manufacturing program for American Railroads

SINCE 1897

THE PYLE-NATIONAL COMPANY

WHERE QUALITY IS TRADITIONAL

1359 North Kostner Avenue, Chicago 51, Illinois

District Offices and Representatives in Principal Cities of the United States. CANADIAN AGENT: The Holden Co., Ltd., Montreal
Export Department: Railway Supply Co., 30 Church Street, New York

LOCOMOTIVE HEADLIGHTS • GYRALITES • TRAINLINE CONNECTORS • MULTI-VENT AIR DISTRIBUTION

Lewis sealtite car bolts

More than 85% of America's Class I railroads use Lewis Sealtite products. Designed to do a better job . . . to last longer . . . to meet the most exacting specifications. Specify Hot Dip Galvanized, Zinc finish for Double-Life and economy.

All products are manufactured in the U.S.A. to A.S.T.M. specifications.

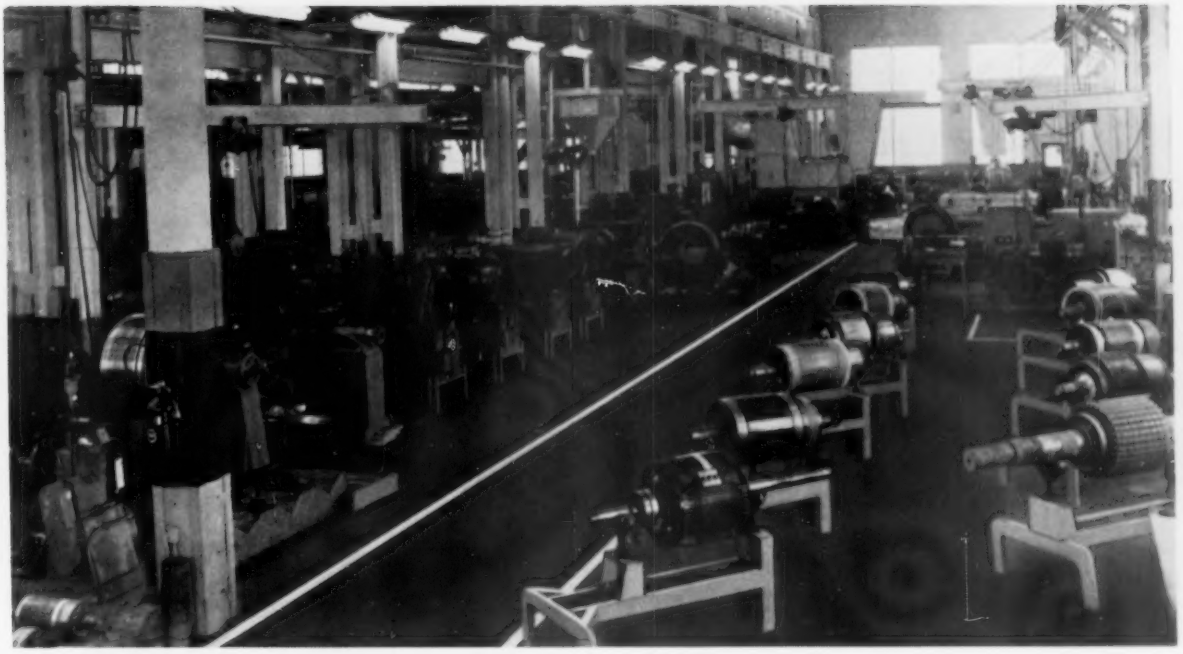
Lewis BOLT & NUT COMPANY
504 Malcolm Ave. S. E.
MINNEAPOLIS 14, MINNESOTA

LOOK FOR THIS STAMP OF U QUALITY

Sealtite bolts are available with Loktite Nut #2 (shown), or std. sq. and hex. nut

—ADVERTISERS IN THIS ISSUE—

Adams & Westlake Company, The 84
Agency—Henri, Hurst & McDonald, Inc.
Aeroquip Corporation 28
Agency—The Fred M. Randall Company
Aircraft-Marine Products, Inc. 102
Agency—Renner Advertisers
Aluminum Company of America 110
Agency—Fuller & Smith & Ross, Inc.
American Hair & Felt Co. 80
Agency—Oscar P. Holtzman Advertising
Association of Manufacturers of Chilled Car Wheels 5
Agency—Schuyler Hopper Co., The
Biddle Co., James G. 112
Agency—The Rolland GE Ullman Organization
Boiler Engineering and Supply Co., Inc. 20
Agency—John B. Ferguson, Jr.
Buckeye Steel Castings Co., The 29
Agency—T. J. Stead, Advertising
Buffalo Brake Beam Company Inside Front Cover
Cincinnati Milling Machine Co., The 44
Agency—Jaap Orr Co.
Consolidated Machine Tool Co. 74, 75
Agency—Hutchins Advertising Co., Inc.
Dana Corporation 39
Agency—Clifford A. Kroening, Inc.
Dearborn Chemical Company 97
Agency—The Buchen Company
Duff-Norton Company 106
Agency—Bond & Starr, Inc.
Elastic Stop Nut Corporation of America 41
Agency—G. M. Basford Company
Electro-Motive Division, General Motors 82, 83
Agency—Kudner Agency, Inc.
Esso Standard Oil Company 11
Agency—McCann-Erickson, Inc.
Ex-Cell-O Corporation 20
Agency—Holden, Clifford, Flint, Inc.
Exide Industrial Division—Electric Storage Battery Co., The 38
Agency—Geare-Marston, Inc.
Fairbanks, Morse & Co. 78, 79
Agency—The Buchen Company
Fine Organics, Inc. 113
Agency—Kermin-Thall
General Electric Co. 76, 77
Agency—G. M. Basford Company
General Steel Castings 34, 35
Agency—Oakleigh R. French & Assoc.
Gould-National Batteries, Inc. 40
Agency—Hutchins Adv. Co., Inc.
Gulf Oil Corporation 16, 17
Agency—Young & Rubicam, Inc.
Hyatt Bearings Division of General Motors 8
Agency—D. P. Brother & Co., Inc.
Ingersoll-Rand 111
Agency—Marsteller, Rickard, Gebhardt & Reed, Inc.
International Nickel Company, Inc., The 4
Agency—Marschalk & Pratt Co., Inc., Div. of McCann-Erickson, Inc.
International Railway Car Co. 100
Agency—Bowman & Block, Inc.
International Steel Company 81
Agency—W. S. Kirkland Advertising
Johns-Manville 94
Agency—J. Walter Thompson Company
Koppers Company, Inc. 18, 19
Agency—Batten, Barton, Durstine & Osborn, Inc.
Lewis Bolt & Nut Company 116
Agency—E. T. Holmgren, Inc.
Lincoln Electric Company, The 101
Agency—Griswold-Eshleman Co.
Linde Air Products Company, a Division of Union Carbide and Carbon Corporation 99
Agency—J. M. Mathes, Inc.
Lix Corporation, The 109
Agency—Walter J. Johnson, Associates
MacLean-Fogg Lock Nut Company 32
Agency—W. S. Kirkland Advertising
Magnus Chemical Co., Inc. 104
Agency—Spooner & Kriegel
Magnus Metal Corporation 72, 73
Agency—Marsteller, Rickard, Gebhardt & Reed, Inc.
Metallizing Engineering Co., Inc. 24
Agency—The Schuyler Hopper Company
Met-L-Wood Corporation 36
Agency—Armstrong Advertising Agency
Mortell Co., J. W. 89
Agency—Ross Roy, Inc.
Morton Manufacturing Company 90
Agency—W. S. Kirkland Advertising
National Carbon Company, a Division of Union Carbide and Carbon Corporation 37
Agency—William Esty & Co.
National Electric Coil Company Inside Back Cover
Agency—Kight Advertising, Inc.
National Malleable and Steel Castings Company 13
Agency—Palm & Patterson, Inc.
Oakite Products, Inc. 1
Agency—Marsteller, Rickard, Gebhardt & Reed, Inc.
Pennsylvania Salt Mfg. Co. 25
Agency—Geare-Marston, Inc.
Pullman-Standard Car Manufacturing Company 26, 27
Agency—Fuller & Smith & Ross, Inc.
Pyle-National Company, The 115
Agency—Calkins & Holden
Radiator Specialty Company 112
Agency—Bennett Evans Company
Ridge Tool Company, The 102
Agency—Carr-Ligett Advtg., Inc.
Roebling's Sons Corporation, John A. 91
Agency—Beatty & Oliver, Inc.
Rust-Oleum Corporation 107
Agency—O'Grady, Andersen & Gray, Inc.
Safety Car Heating and Lighting Company, Inc., The 42
Agency—J. C. Bull, Inc.
Saft Corporation 9
Agency—Conti Advertising
Simplex Wire & Cable Co. 12
Sinclair Refining Company 30, 31
Agency—Morey, Humm & Johnstone, Inc.
Speer Carbon Co. 86
Agency—Hazard Advertising Company
Standard Car Truck Company 93
Agency—Stuart Potter Co.
Standard Oil Company of California 87
Agency—Batten, Barton, Durstine & Osborn, Inc.
Standard Railway Equipment Manufacturing Company 33
Agency—W. S. Kirkland Advertising
Stratoflex, Inc. 113
Agency—Magnussen & Teague
Timken Roller Bearing Company, The Back Cover
Agency—Batten, Barton, Durstine & Osborn, Inc.
Toledo Commutator Co. 20
Agency—Price, Tanner & Willox, Inc.
Torman Company 24
Agency—Barnes Advertising Agency
Turco Products, Inc. 7
Agency—Abbott Kimball Co.
Unit Truck Corp. Inside Front Cover
Van Der Horst Corp. 105
Watson-Stillman Fittings Division 98
Agency—W. L. Towne Advertising
Waugh Equipment Company 95
Westinghouse Air Brake Company 2
Agency—Batten, Barton, Durstine & Osborn, Inc.
Wiedeke Company, Gustav, The 112
Agency—Hutzler Advertising Agency
Wine Railway Appliance Co., The Front Cover
Agency—T. J. Stead, Advertising
Wix Corporation 21
Agency—Humbert & Jones
Wyandotte Chemicals Corporation 103
Agency—Brooke, Smith, French & Dorrance, Inc.



HOW TO OPERATE THE Ideal ELECTRICAL REPAIR SHOP

1 Plan your layout, equipment and payroll for the *minimum* anticipated volume. Keep men and machines busy all the time.

2 Send the jobs you can't handle without overtime to National for fast, high quality rewinding at economical prices—traction motors . . . diesel driven generators . . . auxiliary equipment such as car lighting generators.

3 To assure quality and economy in your own rewinding work make National your first source for replacement coils and rewinding supplies.

The view above shows a part of the traction motor section at National's Columbus, Ohio, plant. For more information on how National facilities like these can help you get the most from every electrical maintenance dollar, write today or get in touch with your nearby National field engineer.

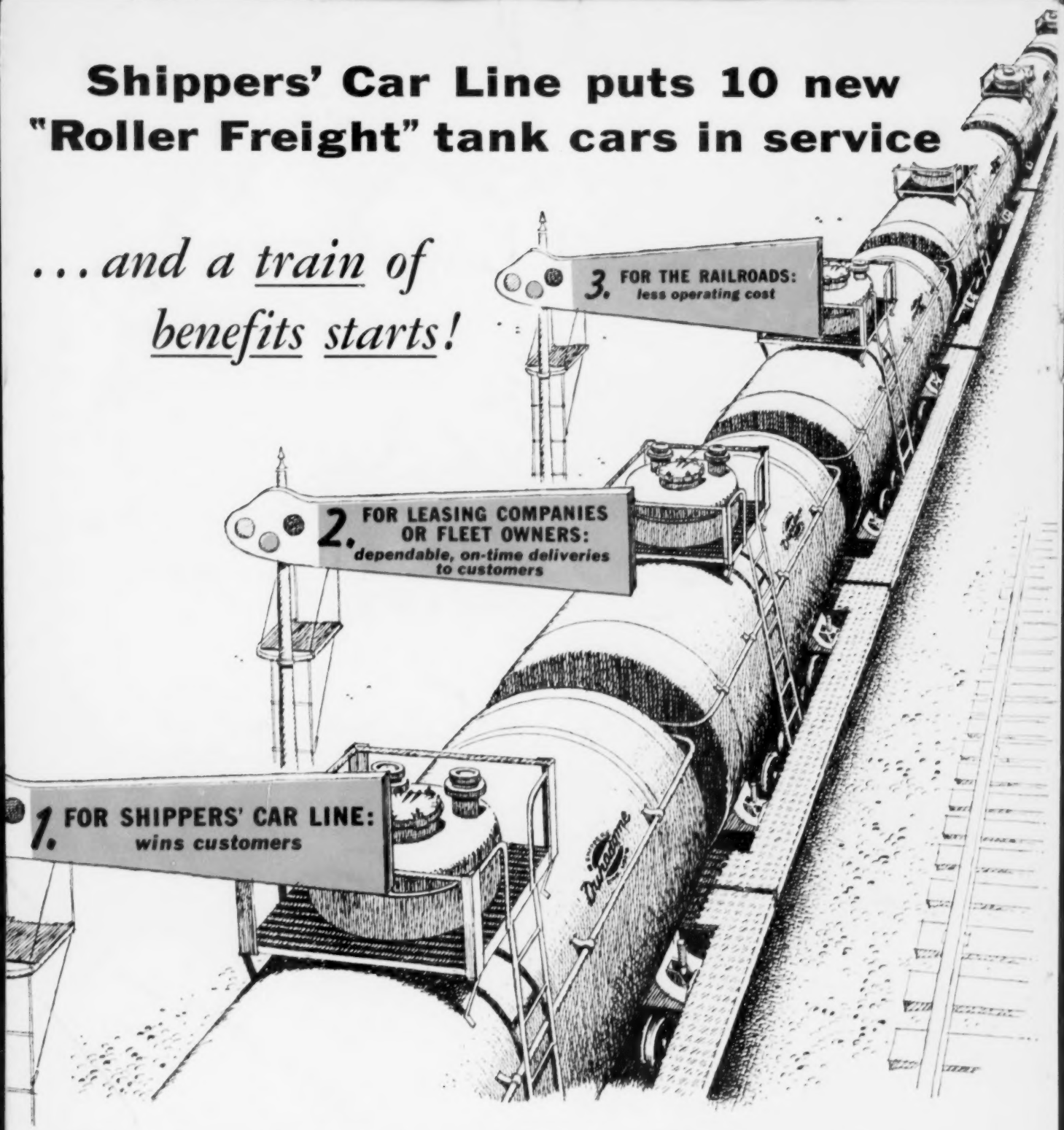
NATIONAL ELECTRIC COIL COMPANY

COLUMBUS 16, OHIO, U. S. A.

ELECTRICAL ENGINEERS: MAKERS OF ELECTRICAL COILS AND INSULATION—
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES

Shippers' Car Line puts 10 new "Roller Freight" tank cars in service

. . . and a train of benefits starts!


3. FOR THE RAILROADS:
less operating cost
2. FOR LEASING COMPANIES OR FLEET OWNERS:
dependable, on-time deliveries to customers
1. FOR SHIPPERS' CAR LINE:
wins customers

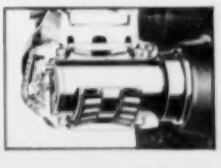
BY equipping 10 new tank cars with Timken® tapered roller bearings, Shippers' Car Line has started a train of benefits that begins with Shippers' itself, includes the leasing companies or fleet owners and their customers, and extends even to the railroads.

Because tank cars often are used for storing commodities as well as transporting them, they may stand as long as three months on a siding. With friction-bearing-equipped cars, the oil film between axles and "brasses" disappears during these long waiting periods and moisture in the journal box corrodes the journals. As a result, when the car goes back into service, the axle is apt to be cut and become overheated, and a hot box results.

Timken tapered roller bearings on Shippers' Car Line's 10 new cars eliminate the hot box problem because their lubrication can't fail. "Roller Freight" cars provide greater availability, are always ready to roll no matter how long they've been idle. Thus, a train of benefits results all along the line. Shippers' Car Line gains a big talking point in the lease or sale of cars because of advantages to its customers. These customers can, in turn, provide *their* customers with dependable, on-time deliveries. And the railroads benefit because Timken bearings eliminate the hot box problem, cut terminal bearing inspection time 90%, reduce cost of lubricant as much as 89%. Result: train delays are greatly reduced.

Whether you own, lease, or operate cars, "Roller Freight" results in dependable, on-time deliveries—hence, satisfied customers. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN

TRADE-MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS